TECHNOLOGY DEPT.

SEPTEMBER
1932

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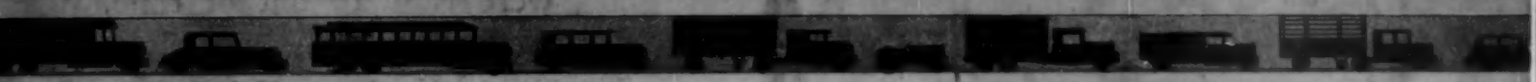
FLEET OWNER

THE FERGUSON PUBLISHING CO., 90 WEST ST., NEW YORK, N.Y.

Devoted to the Better Operation and Maintenance of Truck, Bus, Taxicab, Passenger Car and All Automotive Fleets



Applying the Cost "Yardstick"

By Clinton Brettell

Safety Program Reduces Costs

By S. J. Cashel

Self Maintenance Vs. "Farming Out"

H. V. Middleworth

For Better Clutch Maintenance

(A "How-to-Do-It" Article)

Servicing New-Type Bendix Brakes

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Question-of-the-Month Club

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IF this distributor increases the mileage, eliminates spark knocks, which everyone knows batter engines to pieces, you will then be convinced that the statement, "The engine is running out of time." is true.

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the advantage that you don't have to use BLASTING POWDER to get the joint apart when you unbolt it for opening up, later on. Send coupon NOW for FREE SAMPLE. Attach business card or bill-head for a BIG sample.

SEND COUPON NOW FOR FREE SAMPLES

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The

FLEET OWNER

Published Monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops and devoted to the better Operation and Maintenance of Truck, Trailer, Bus, Passenger Car, Taxicab and all Automotive Fleets.

Vol. 9 New York, September, 1932 No. 3

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Published Monthly by

The FERGUSON PUBLISHING COMPANY

90 West Street, New York City

E. F. Ferguson
President

A. L. Conley
Sec. and Treas.

Henry Clay Fischer
Editor

Advertising Representatives:

Chicago—Dudley B. Trott, 840 Montrose Ave.
Detroit—Edward C. Hillier, Ft. Shelby Hotel.
New York—J. Hayes Fuller, 90 West Street.
Philadelphia—Hal. H. Clark, 170 Woodbine Rd., Manoa, Pa.
Los Angeles—R. H. Deibler, 1341 S. Hope St.

Subscription: $1.00 Yearly; Single Copies 10c.

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DU PONT ANTI-FREEZE
REG. U. S. PAT. OFF.

METHANOL

NO CORROSION

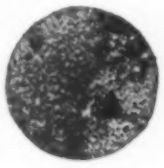
*HERE IS PROOF

These photomicrographs show the results of a seven-week test of the corrosive action on engines and radiators of widely sold, low-priced anti-freezes compared with du Pont Anti-Freeze Methanol.

A few minutes after filling

ORDINARY ANTI-FREEZE

Rapid rusting (corrosion) resulting from using ordinary anti-freeze, shown by large increase in abrasive sediment.



Seven weeks later

A few minutes after filling

DU PONT ANTI-FREEZE METHANOL

No noticeable increase in sediment shows rust (corrosion) protection afforded by du Pont Anti-Freeze Methanol.

Seven weeks later

WHEN you protect your fleet with du Pont Anti-Freeze Methanol you prevent corrosion* in engines and radiators. That's one profitable dollar-saving. Six other reasons why you should use du Pont Anti-Freeze are:

1 – It is economical to buy and use.

2 – It does not readily boil off.

3 – It has no unpleasant odor.

4 – It gives complete radiator protection at low cost.

5 – It maintains cooling plant efficiency.

6 – It is colored purple for your protection and identification.

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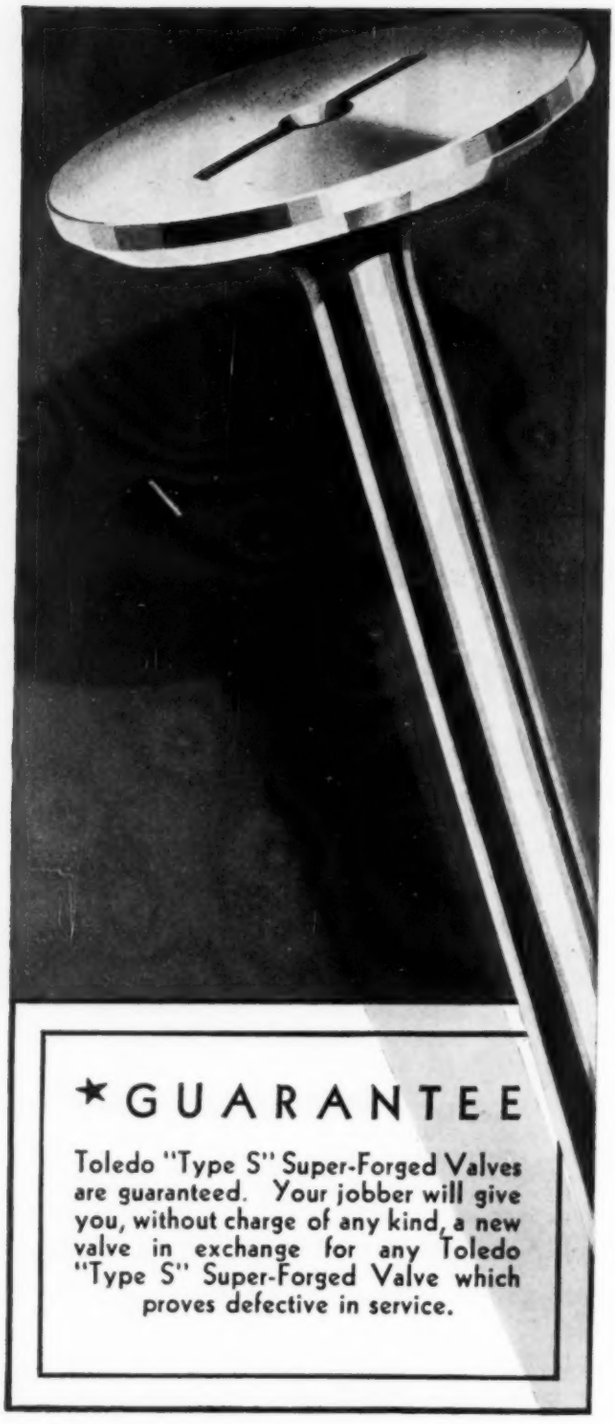
City.....**State**.....



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Say "I saw it in FLEET OWNER"—It Helps!

VOL. 9
NO. 3

The FLEET OWNER

SEPT.
1932

When to Retire Those Old Vehicles? . . . . . .

The Editor's Page

THE much mooted question of "When to trade in the old truck or bus?" is answered to a certain extent, it seems, in the statement of a leading executive, which has recently been brought to our attention. Strange as it may seem, our good friends, the railroads, have contributed this bit of experience this time. Here's what he has to say:

"A fleet of modern locomotives, put in service on a single railroad, paid for itself in economies in a single year. Operating policies which can result in making the new equipment perform from 5,000 to 10,000 miles per month, sometimes create conditions where entire fleets of new locomotives pay for themselves over and over again for years thereafter."

Our comparison of a locomotive with a truck or bus is not a far-fetched one. Both are power units whose function is that of hauling. No one will deny the fact that it costs money to operate an obsolete vehicle, regardless of whether it is a wheelbarrow or a 5-ton truck. Sometimes the daily savings made possible by up-to-date equipment will far exceed the added expense of interest and depreciation entailed by the new vehicle.

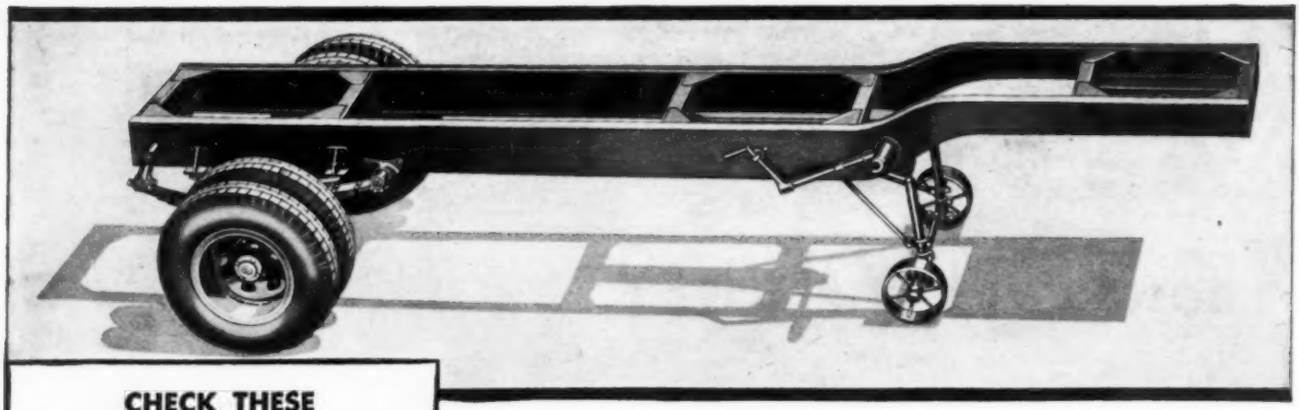
With modern equipment, schedules can be speeded up, daily mileage per vehicle can be increased, two new trucks might be made to do the work of three old ones, and other beneficial economies could be effected. The factor of increasing daily vehicle mileage, provided that "units delivered" does not suffer, is of great importance because as daily vehicle mileage increases, operation and maintenance costs per mile will decrease. (See Clinton Brettell's article in the April, 1932 issue of FLEET OWNER.)

Frankly, Mr. Operator, we are not trying to make the Truck Salesman's job a veritable Paradise, but we sincerely believe that fleet operators should take a little time out to make a thorough study of their equipment. If you ask us "What are we going to use for money?" the answer is: "The money you will make and save by doing the same work easier, faster and cheaper." (There ought to be gasoline savings here, too.)

The thing to remember is that Old Man Obsolescence is a hard task-master and the toll he exacts each year from the operation of worn-out equipment is tremendous.

ANNOUNCING 2 NEW GMT TRAILERS

These two new GMT trailers—the TT-252 and the TT-418—offer many outstanding advantages in construction and design. Their payload capacity is greater, while the dead-weight of each unit is less. Their frames, axles and springs are bigger and stronger. Their features are simplified and improved. In every respect, they are built like trucks, to stand up under heavy going, indefinitely. Investigate the facts today. The coupon below will bring you complete information about the complete GMT "truck-built" trailer line.



CHECK THESE ADVANTAGES OF GMT TRUCKS AND TRAILERS

Many wearing parts of tractor and trailer are interchangeable.

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GMTs have a greater service representation than all other leading makes of trailers combined.

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Truck-type brakes are used on GMT trailers. Power actuation is available.

•

"One-Man" Fifth Wheel enables the driver to couple and uncouple without assistance.

•

GMT "truck" design and manufacturing precision mean reduced weight, greater strength, greater payload capacity and longer life.

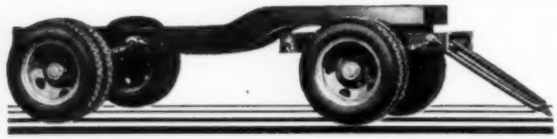
THE NEW TT-252 5-10 TON SEMI-TRAILER AT $810

offers these spectacular advantages

Haulers who are using semi-trailer equipment will find that this new GMT 5-10 Ton Unit at $810 will produce remarkable hauling economies.

The unusually high payload capacity of the TT-252 has been accomplished with less than the usual dead-weight. The abundant strength of the frame is assured through the use of one-piece pressed steel with a depth of 11 15/16 inches, and six deep channel cross-members with exceptionally wide gusset plates. A larger axle beam and heavy auxiliary type springs are provided. The fifth wheel is notable for its simplicity and rugged design. The improved, front wheel supports are quickly adjustable, with fully-enclosed and protected operating mechanism. Heavy drop-forged demountable wheels are standard equipment.

THE NEW TT-418 4-WHEEL TRAILER, 3-5 TON, AT $785



This new GMT 3-5 ton 4-wheel trailer offers increased payload capacity with lower dead-weight. The frame is exceptionally strong, and introduces one-piece pressed steel drop-frame construction to 4-wheel trailer design, resulting in a lower center of gravity. The frame is 8¾ inches deep, strengthened by channel cross-members. The front end of the frame is in-swept to provide maximum turning radius. Among the other features are an improved draw bar of seamless steel tubing, stronger and lighter in weight; heavier rear axle, 2¾ inches square; heavy-duty plain bearing turn table; and demountable disc wheels.

General Motors Truck Company, Pontiac, Michigan

Please send me complete information on the complete line GMT truck-built trailers.

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City and State_____ 35-1

GENERAL MOTORS TRUCK CO.

(A Subsidiary of Yellow Coach & Truck Mfg. Co.)

PONTIAC MICHIGAN

By Clinton Brettell,
Garage Superintendent, R. H. Macy & Co., New York.

Applying the Cost "Yardstick"

Carrying the "Yardstick" Idea Further, We Can Intelligently Analyze Such Factors as Tire Mileage, Gasoline Consumption, Etc., and Their Relation to Daily Vehicle Mileage and "Units Delivered." The Result?—A Positive Check on Vehicle Performance

IN an article appearing in the April issue of this publication the writer suggested a method of eliminating the most confusing variable in "Operating Costs" by applying the "Yardstick" of **Average Daily Mileage** in bringing the costs under consideration to a uniform and comparable basis. The chart on this page shows just how much (percentage) the average costs should decrease, as the daily mileage per vehicle is increased.

It is the purpose of the present treatise to enlarge upon this idea and carry it along into other operating records, as a means of eliminating the same sort of variables that ordinarliy interfere with proper comparisons of these details of operation. In other words, as the daily mileage per vehicle is stepped up, corresponding increases may be noted in gasoline mileage, tire mileage and other details that go to make up operation and maintenance costs. A few of these might be enumerated as follows:

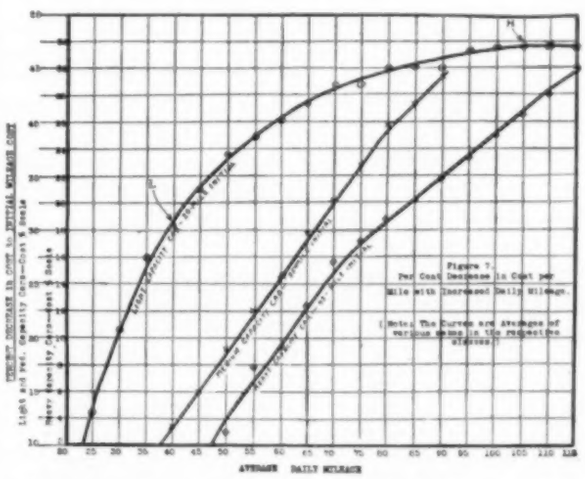
(1) **Gasoline Consumption**—Average miles covered per gallon consumed. It is important to know whether a vehicle is giving at least an average performance in this respect, with due consideration for the conditions under which it is operated.

A poor performance — aside from the actual wastage of fuel—is an indication of other factors back of it which in most cases **can and should be corrected or more serious consequences will follow.** Some of these factors might be enumerated as: Unnecessary idling of motor, poor carburetor adjustment, excessive use of choke, poor engine condition, improper ignition, etc.

Some of these are operating matters—others of a maintenance nature, and a process of elimination is usually necessary to determine the cause, in order that corrective measures may be applied, for the continuance of these conditions will result in unnecessary maintenance at some future date.

However, as previously explained, in order to make a start along this line, it is necessary to set up a standard of "average performance" to check each vehicle against, and in doing this it is found that **Average Daily Mileage** is the most logical basis on which to compile such a chart.

A typical one for various types and capacities of trucks is shown in Figure 1. Such a chart is prepared by taking average "gas mileages" and the corresponding "daily mileages" for individual cars and grouping the gas figures on the basis of average daily mileage.



This chart, which originally appeared with the first "Yardstick" article in our April issue, gives average percentages of decrease in operating cost, as daily vehicle mileage is increased. Three types of vehicles are represented therein.

By averaging the figures in the various groups, a tabulation is obtained for each type of car, which can be plotted on a chart, with horizontal divisions representing average daily mileage and vertical divisions representing miles per gallon. The curves thus obtained are found to follow the same general trend—the higher the miles per gallon, the higher the average daily mileage.

(2) **Current Consumption** — (Amp. Hours per Mile). This is the figure in electric truck service that is comparable to miles per gallon in gasoline car work. A chart covering this detail is prepared in exactly the same manner as explained previously and naturally, shows a reduction of current draw (AH/mile) as the average daily mileage increases.

A typical Current-Mileage chart is shown in Figure 2. High current consumption resulting in excessive battery drain and shortening of operating radius is extremely important, and its cause must be determined and corrected, if possible, before successful and economical operation can be realized.

(3) **Tire Mileage**—By the same line of reasoning, it follows that the ultimate tire mileage on braking and driving wheels will follow this same trend, owing to the fact that on high daily mileage runs, there is less starting and stopping to wear the tread off the tire.

(Please turn to page 10)

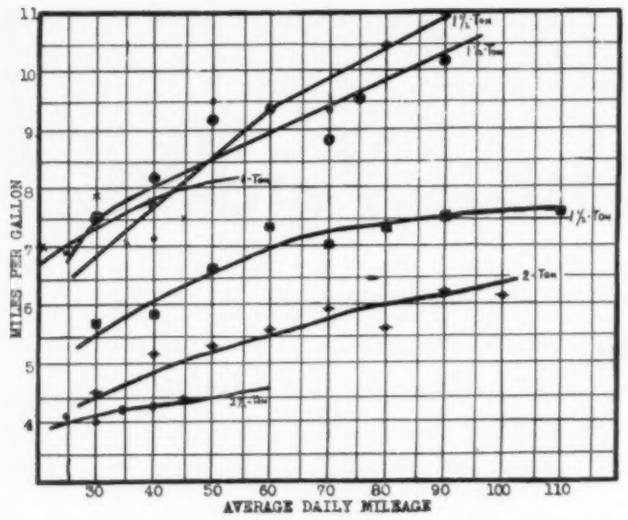


Figure 1—Chart showing how average gasoline mileage increases as daily vehicle mileage is increased. This chart was prepared from cost figures covering six different vehicles of the tonnages indicated.

A test by the Rubber Association of America demonstrated this effect and that Association announced that repeated decelerations to a stop, and rapid accelerations, caused "one-half of the tread design to be worn off in 108 miles."

A typical Tire Mileage Chart for 8.25 x 20 balloon on 1½ Ton Route Truck, rear wheels, is given in

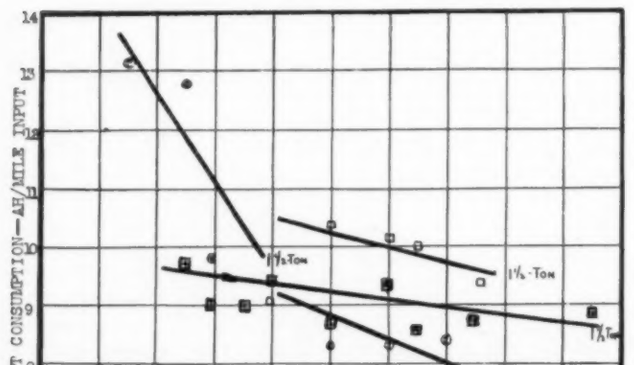


Figure 2—Chart showing how the average electric current consumption on electric trucks decreases with increased daily vehicle mileage. Four different vehicles are included, the current consumption being figured by the average ampere-hour input at recharging time.

Figure 3, showing that the life of the tire increases in proportion to the average daily mileage. Performance of tire makes or car makes (as regards tire wear), etc., can only be accurately gauged by such a method of comparison.

(4) **Daily Production**—Gallons delivered, pieces handled, tons shipped, or whatever production unit may fit into the picture, can be correlated to average daily mileage in the same manner as previously indicated. It is self-evident that the more condensed the territory in which deliveries are being made, the more units can be delivered in a given interval, and the less time spent in covering "dead mileage." This, of course, presupposes that the vehicles employed are comparable as to speed, capacity, etc.

A typical chart indicating this trend, which can be used for determining the efficiency of driver and truck, and other purposes, is shown in Figure 4.

In the foregoing paragraphs it is to be noted that the first three items are involved in operating costs per mile, whereas the last one is a record of work done by the vehicle—units delivered. Further, that the "cost" items **all** drop with increased mileage, and likewise the "production" figure.

Therefore, the "cost per unit," being the cost, divided by the number of units delivered, should be fairly uniform, regardless of average daily mileage.

Actually, it probably increases somewhat, particularly at the higher mileage, inasmuch as the "production" factor falls off more rapidly with increased mileage than does the "cost" factor.

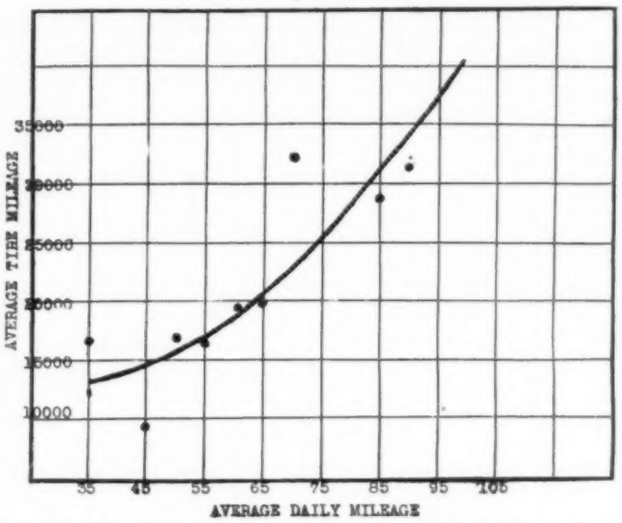


Figure 3—Tire mileage, also, increases as daily vehicle mileage increases, because less starts and stops are made. This curve is taken from a 1½-ton route truck on 8.25 x 20 balloons. The rear wheels only are figured in this instance.

There are doubtless other applications of this same principle that will occur to each individual fleet owner in his own particular field of operation.

It is the purpose of these articles merely to point the way to cost comparisons that really mean something, and if these articles have served to arouse your interest in that direction, our purpose will have been accomplished.

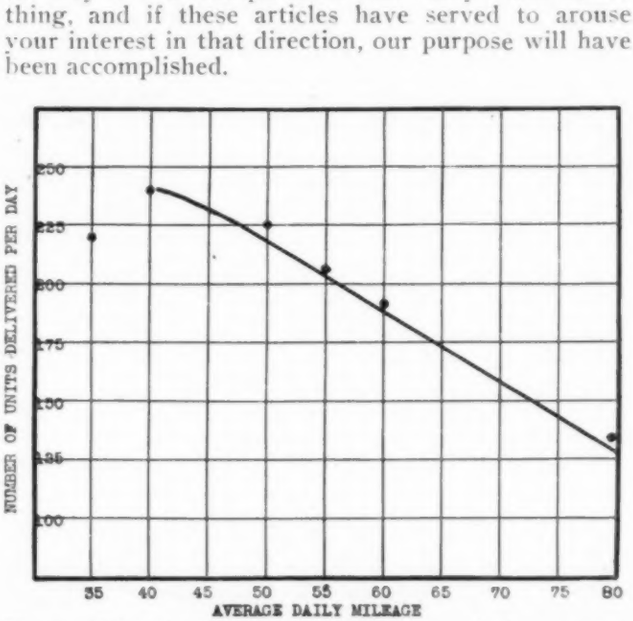


Figure 4—When the daily mileage is increased, production, or "units delivered" will suffer somewhat, as this chart shows.

EVEREADY PRESTONE

gives more protection per gallon and less is required per car than with any other anti-freeze

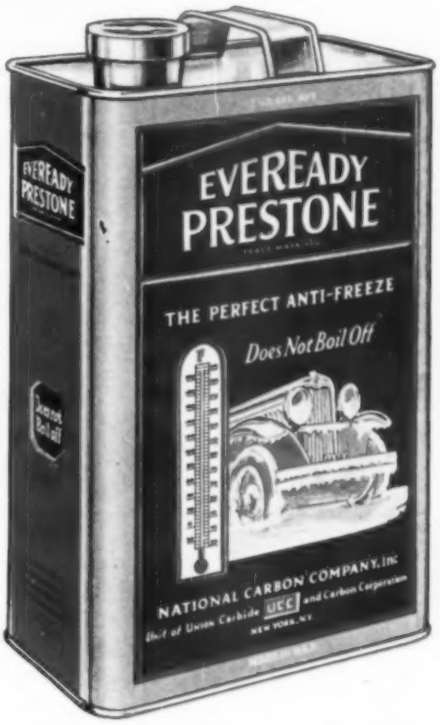
EVERY ONE knows that Eveready Prestone is a highly efficient, highly concentrated anti-freeze. Thousands of bus and truck operators have used it, and it is approved by all U. S. car and leading radiator manufacturers. But few fleet operators realize that an anti-freeze can be made to serve a double purpose, and give extra protection.

Eveready Prestone prevents corrosion

Eveready Prestone does more than prevent freezing—it stops the formation of rust in cooling-systems. It stops corrosion and clogging. Examine the photographs here. They illustrate actual conditions of operation when various anti-freezes are used.

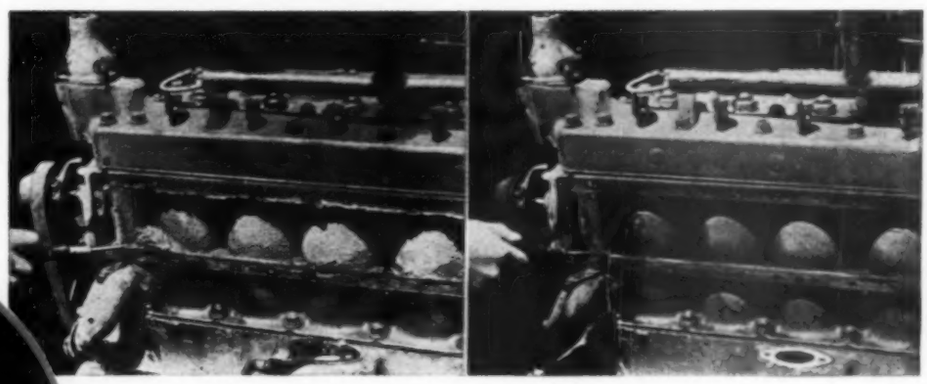
In addition to preventing freezing and rusting, Eveready Prestone is treated to prevent leakage. A cooling-system that will hold water will hold Eveready Prestone.

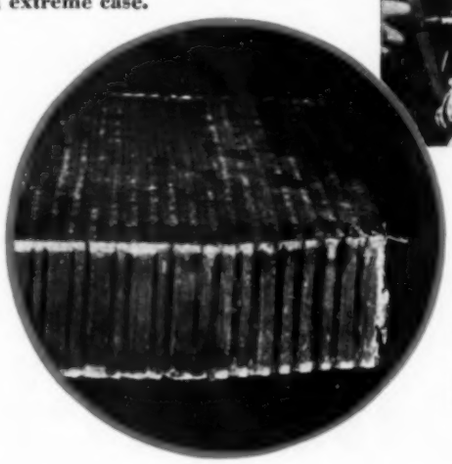
Because Eveready Prestone is highly concentrated, less of it is needed than with other anti-freezes. It does not boil off—a single, economical filling makes a car safe for the season.



NATIONAL CARBON CO., INC.
General Offices: New York, N. Y.
Branches: Chicago New York San Francisco
Unit of Union Carbide UCC *and Carbon Corporation*

Here is what water and ordinary anti-freeze solutions do to the water-jackets of an engine. Notice the rust and sludge, around No. 1 cylinder, ready to circulate through the radiator and cause clogging and overheating. This cooling-system is in bad shape, but fleet-operators know that it is not an extreme case.





Here is a radiator-core, ready for the junk-pile. It is too badly clogged for repairs. The operator had to have a new core installed, and lost the use of his equipment, and the revenue from it, while the new core was being put in. Eveready Prestone would have prevented this.

Notice how clean the water-jackets are here. No scale, no rust. This is the way Eveready Prestone preserves an engine, keeping it clean, cool and efficient. An overheated engine lacks power and pep, and tends to cause pre-ignition. A cool engine uses less gas, causes less trouble, costs less to run and lowers depreciation.

EVEREADY **PRESTONE**

Say "I saw it in FLEET OWNER"—It Helps!

TOM AND JERRY — *Tom sells Jerry the*

"Say Jerry, these new truck tires sure are great stuff. This man-killer of mine rides like a Rolls Royce now."
"Yes, Tom, I know. This repair shop begins to look like a morgue. Nobody hollers about loose bodies or hinges any more. Broken parts are a thing of the past."
"You're right, Tom. These new tires are a big step ahead. It's tough on me though. If this keeps up I'll have to start taking in washing."
"Say, what are you fellows talking about, anyway!"
Goodrich Silvertown
MANAG

THE New Goodrich Silvertown Truck Tire is not just "another model." Three years of intensive research in which eighteen types of experimental tires were produced and run 1,257,000 test miles, lay behind it.

We mean it when we say this new Silvertown will deliver MORE miles, FASTER miles, SAFER miles, CHEAPER miles, than any truck tire ever before built.

Your nearest Goodrich Distributor will back up these claims — show how the new Silvertown can lower *your* costs — increase *your* trucks' efficiency. Phone him now. Look under "Tires" in the classified directory.

The B. F. Goodrich Rubber Company, Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Cal. In Canada: Canadian Goodrich Co., Ltd., Kitchener, Ont. The International B. F. Goodrich Corp. (Export).

Goodrich

32,000 Rubber Articles • Goodrich Silvertowns • Zippers • Rubber Footwear
Drug Sundries • Soles • Heels • Hose • Belting • Packing • Molded Goods

Say "I saw it in FLEET OWNER"—It Helps!

Big Idea . . .

"The boss says we've cut road delays nearly in half. I know I can cover more territory now than ever. And I haven't had a breakage claim or late delivery since we changed over."
"THE NEW GOODRICH SILVERTOWN TRUCK BALLOON!"

Be a Transportation Expert

Learn more about tires — it's a sure way to save money — big money. Get the especially prepared Goodrich Booklet which is full of truck-tire facts that you can put to immediate use. Tear this out — write your name and address on the border, and mail to the Truck & Bus Tire Department, The B. F. Goodrich Rubber Company, Akron, Ohio.

Truck Balloons

Another B. F. Goodrich *Product*

Say "I saw it in FLEET OWNER"—It Helps!

By S. J. Cashel
Vice-President, Columbia Terminals Co., Saint Louis, Mo.

How Our Safety Program Cut Fleet Costs

OUR fleet of more than 800 motor trucks, tractors and trailers is operated in conjunction with our warehousing and freight transportation business in the cities of St. Louis and East St. Louis.

We have learned, through the operation of this fleet, that a well organized safety program conducted among commercial vehicle operators will produce results of outstanding economic value. This has been proven by the experience, during the past five years, of the Columbia Terminals Company.

In 1926, the first year of our safety work, 818 accidents were reported; during 1931, this figure was reduced to 119, less than 40 per cent of which involved lost time of our employees or property damage in excess of $10.

During the latter part of 1925, a steadily increasing number of accidents were experienced by the motor vehicles of this company. This increase in accidents, with its resulting increase in claims and claim expenditures, was having a marked effect on our operating expenses. For the past five years, however, the continued decrease, culminating in the splendid record of 1931, has helped reduce our operating costs, improve our standing in the community, increase the interest which our supervisors have taken in their work and, last, but of major importance, has developed a cooperative relationship between our company and our employees.

Prior to the initiation of our safety program, a preliminary survey of the accident situation indicated that the increase of automobiles on the city streets, and the limited facilities for handling the volume of traffic efficiently during peak hours, were the chief causes of our growing accident record. It was also evident that these factors were beyond the control of our management. It was believed, therefore, that on organized educational program to promote safe practices among our employees was necessary if our experience was to be improved.

It was obvious from our preliminary study that the expense caused by accidents was just as important as any other item entering into the cost of operating motor vehicles. Therefore, the company undertook accident prevention as a business proposition, and each phase of the work was considered carefully in order to reduce the number of accidents and the resulting expense.

As the success or failure of this undertaking apparently depended largely upon official direction, the Vice-President of the company was placed in active charge of the work. This officer has devoted much of his time to perfecting the various details of the program, including the safe maintenance of our motor equipment and the conduct of educational activities. He in turn, holds the superintendents, supervisors, foremen and others of the supervisory force responsible for the accident experience of their respective departments or units.

One of the first items considered in our safety program was the safeguarding and safe maintenance of our mechanical equipment. Proper results could not be expected if defective equipment was used and, therefore, it was unreasonable to expect the drivers' co-operation under such circumstances.

For these reasons, a daily inspection is made of all motor equipment. Drivers are required, when turning in equipment, to make a written report of any defects which they have noticed. A competent mechanical force is maintained, and reports from drivers are acted upon promptly. This plan automatically insures the correction of defects before the car is used again, and indicates to drivers that the company is sincere and endeavoring to do its part in the safety program.

Our experience shows that complete facts concerning the causes of accidents are necessary to the successful direction of our preventive work. It has been found also that a record of accidents, an account of the company's standing for the current year as compared with previous years, as well as periodic tabulations of acci-

COLUMBIA TERMINALS CO.
Defect Report

Vehicle No. _____ Make _____ Capacity _____ Date _____
Chauffeur _____ Time _____

LIST DEFECTS BELOW	CAUSE

Name of Party Taking Report

Repair Record

MECHANIC	WORK DONE	HOURS	RATE	AMT.
			TOTAL LABOR	

Parts Used

PARTS PURCHASED	COST	PARTS FROM STOCK	COST
		TOTAL PARTS	

Repairs Completed: Date _____ Time _____ Total Cost $ _____

Shop Clerk _____

Driver's Defect Report. This form is a combination of driver-report and repair record, around which the system works.

NEW LOW PRICES ON American Brakeblok

IN SETS FOR PLYMOUTH, CHEVROLET AND FORD

To everyone responsible for the maintenance economy and operating safety of light commercial vehicles and passenger cars, the announcement of new low prices on American Brakeblok for Plymouth, Chevrolet and Ford is of real importance.

Through superiority of performance and economy in service, American Brakeblok has practically doubled in sales volume this year, as compared to 1931. Increased production on American Brakeblok for these popular cars has lowered costs and made possible a substantial reduction in price.

American Brakeblok always has been known for its durability—its slow and uniform wear—even under the most trying service conditions. At today's new low prices, we sincerely believe that mile for mile and stop for stop, American Brakeblok will give you more for your money than any brake lining you have ever used. American Brakeblok will give quicker, smoother, *safer* stops. And it will reduce maintenance expense further because it requires fewer adjustments than ordinary brake linings.

Despite their comparatively light weight, Plymouth, Chevrolet and Ford *need* just as good a brake lining as any vehicle you service. Their smaller area of braking surface requires each square inch of brake lining to carry a bigger load, and *stop more weight*, than in many larger vehicles.

Specify American Brakeblok for your next relining jobs. We have prepared some data on light car and commercial vehicle braking which we believe will be of unusual interest to you. We shall be glad to send it to you if you will fill out and mail the coupon below.

AMERICAN BRAKE MATERIALS CORPORATION
4660 Merritt Ave., Detroit, Mich., U. S. A.
Industrial and Automotive Division
American Brake Shoe & Foundry Company
Sales Offices: New York, Cleveland, Chicago
St. Louis, Los Angeles, San Francisco

AMERICAN BRAKE MATERIALS CORPORATION, 4660 MERRITT AVENUE, DETROIT

Gentlemen: I will be interested in receiving your data on light car and commercial vehicle braking.

Name.....

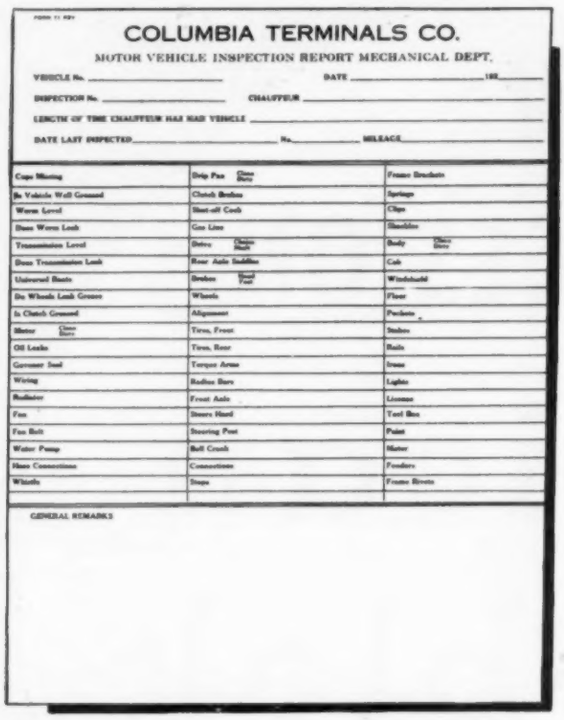
Company.....

City..... *State*.....

AMERICAN BRAKEBLOK
TRADE-MARK

Say "I saw it in FLEET OWNER"—It Helps!

A "HOW-WE-DO-IT" ARTICLE *(Continued)*



COLUMBIA TERMINALS CO.

MOTOR VEHICLE INSPECTION REPORT MECHANICAL DEPT.

VEHICLE No. _____ DATE _____ 193_____

INSPECTION No. _____ CHAUFFEUR _____

LENGTH OF TIME CHAUFFEUR HAS HAD VEHICLE _____

DATE LAST INSPECTED _____ No. _____ MILEAGE _____

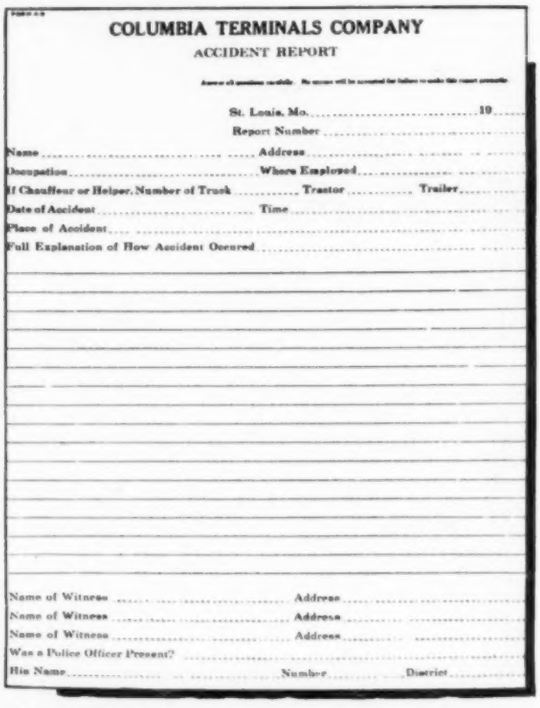
Cups Missing	Drip Pan (Upper / Lower)	Frame Brackets
Rs Vehicle Well Greased	Clutch Brakes	Springs
Worm Level	Shut-off Cock	Clips
Diff. Worm Leak	Gas Line	Shackles
Transmission Level	Drive (Chain / Shaft)	Body (Upper / Lower)
Diff. Transmission Leak	Rear Axle Inside	Cab
Universal Bents	Brakes (Hand / Foot)	Windshield
Rs Wheels Leak Grease	Wheels	Floor
Is Clutch Greased	Alignment	Pockets
Motor (Upper / Lower)	Tires, Front	Stakes
Oil Leaks	Tires, Rear	Rails
Governor Used	Torque Arms	Irons
Wiring	Radius Bars	Lights
Radiator	Front Axle	Licenses
Fan	Steers Hard	Tool Box
Fan Belt	Steering Post	Paint
Water Pump	Ball Crank	Motor
Hose Connections	Connections	Fenders
Wheels	Steps	Frame Rivets

GENERAL REMARKS

General Inspection Report, used by Columbia Terminals Company, is not unlike those used by other fleet operators.

dent costs, provide measures of the effectiveness of our safety work.

To secure this information, so that we may know where preventive efforts should be concentrated, a constant check is made of the accident experience of drivers by means of individual records. These, analyzed monthly, may indicate tendencies toward laxity, and suggest proper actions which the company may take.



COLUMBIA TERMINALS COMPANY

ACCIDENT REPORT

Answer all questions carefully. No accident will be accepted for failure to make this report correctly.

St. Louis, Mo. ..... 19.....

Report Number .....

Name ..... Address .....

Occupation ..... Where Employed .....

If Chauffeur or Helper, Number of Truck ..... Tractor ..... Trailer .....

Date of Accident ..... Time .....

Place of Accident .....

Full Explanation of How Accident Occured .....

Name of Witness ..... Address .....

Name of Witness ..... Address .....

Name of Witness ..... Address .....

Was a Police Officer Present? .....

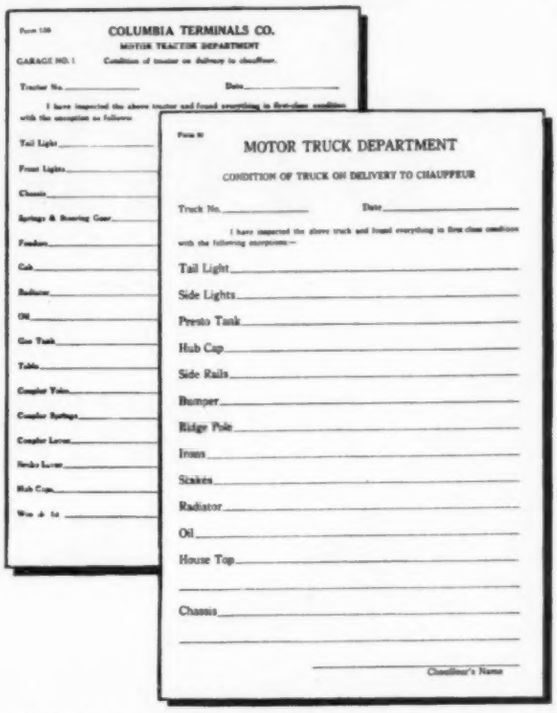
His Name ..... Number ..... District .....

One side of the accident report form. The other side contains space for personal injury and property damage information; also a diagram of how the accident occured.

When an accident occurs, a report is telephoned immediately to the claim department and a preliminary report, giving all available details is prepared and sent to the proper official. This speed has been of great importance in the efficient handling of cases involving compensation claims and damage suits.

Should a driver's record for a two to three months' period indicate an unfavorable experience, he is relieved of his duties in order to determine his faults, and an effort is made to correct them. This interest has served to teach drivers that the company cannot afford to employ inefficient operators, and that safe driving habits are considered essentials of their job.

Safe driving demands resourcefulness, intelligence, judgment, and ability to think quickly and act instinctively. In the selection of drivers, therefore, these qualifications and a thorough knowledge of motor vehicles and traffic regulations are considered fundamental. We also require unimpaired eyesight and hearing, good



COLUMBIA TERMINALS CO.

MOTOR TRACTOR DEPARTMENT

GARAGE NO. 1 Condition of tractor on delivery to chauffeur.

Tractor No. _____ Date _____

I have inspected the above tractor and found everything in first-class condition with the exception as follows:

Tail Light _____

Front Lights _____

Chassis _____

Springs & Steering Gear _____

Fenders _____

Cab _____

Radiator _____

Oil _____

Gas Tank _____

Table _____

Coupler Pole _____

Coupler Springs _____

Coupler Lever _____

Brake Lever _____

Hub Caps _____

Wheels & Tires _____

MOTOR TRUCK DEPARTMENT

CONDITION OF TRUCK ON DELIVERY TO CHAUFFEUR

Truck No. _____ Date _____

I have inspected the above truck and found everything in first class condition with the following exceptions:—

Tail Light _____

Side Lights _____

Presto Tank _____

Hub Cap _____

Side Rails _____

Bumper _____

Ridge Pole _____

Irons _____

Stakes _____

Radiator _____

Oil _____

House Top _____

Chassis _____

Chauffeur's Name

One of the important features is this driver-acknowledgement as to the condition of a vehicle on delivery to him. It saves many arguments.

habits and health, as well as a proper attitude toward safety.

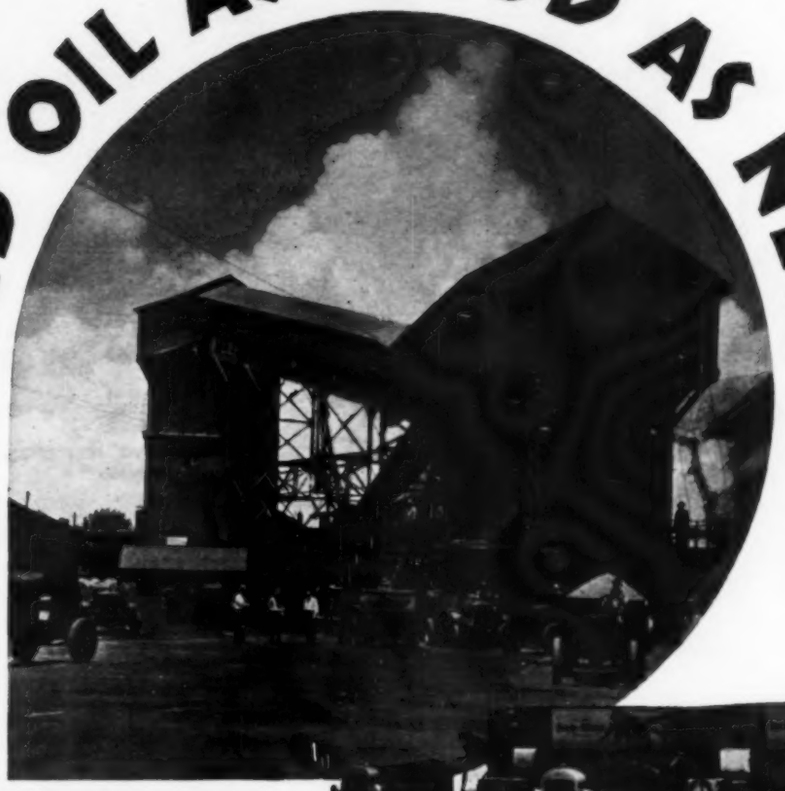
A chauffeur, before being authorized to drive, must first serve as a helper and be passed upon by the superintendent who, on two or three occasions, rides with the applicant before he is approved for permanent assignment.

A committee, known as the Accident Prevention Committee, has been selected from various departments. This committee consists of about twelve members and includes superintendents, foremen, mechanics, chauffeurs, helpers, loaders and truckers. Meetings are held monthly. Accidents which have occurred during the preceding month are discussed, and suggestions to prevent recurrences are made.

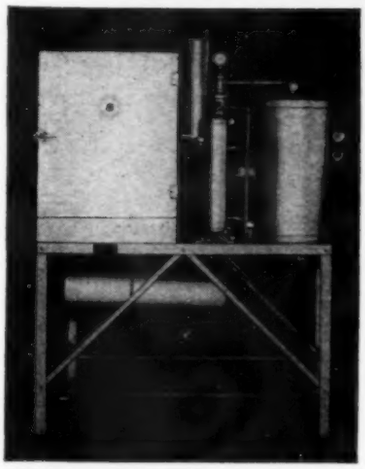
Employees involved in serious accidents are required to attend these meetings to assist in describing how the

(Please turn to page 44)

"RECLAIMED OIL AS GOOD AS NEW" writes



Mr. Jno. C. Eakin, Secy. & Treas. of Big Rock Stone & Material Co., of Little Rock, Arkansas who also states that "The cost of this reclaiming averages about 7c per gallon —a very economical process".



HERE'S THE MACHINE THAT'S reducing oil bills for hundreds of prominent operators of all types of fleets—40% to 60%. Skinner Reclaimers are priced as low as $290. There's a size to meet your particular operating needs. Get the facts and figures about this dollar-and-oil saving equipment. No obligation. Mail the coupon today.

from California

"Laboratory test shows Skinner Reclaimed Oil almost identical with original oil specifications,"—writes H. O. Linsday, Chief Engineer, Pennant Oil and Grease Co., Los Angeles.

from Missouri

"Practically no difference between new oil and Skinner Reclaimed Oil"—writes Ant. Nay, Gen. Supt. of Maintenance & Operation, Pickwick-Greyhound Lines, Inc., Kansas City.

from Massachusetts

"Skinner Reclaimed Oil as good as new"—writes Percy A. Chamberlain, Prop., Oakdale Garage & Bus Line, Dedham.

from Ohio

"Any operator can effect economies with a Skinner"—writes S. C. Huffman, Operations Mgr., Embry-Riddle Co., (subsidiary of The Aviation Corp.) Lunken Airport, Cincinnati.

SKINNER RECLAIMED OIL IS AS GOOD AS NEW OIL! There's no argument about it. Every conceivable test, in actual usage in all types of operation, long ago established the fact that Skinner Reclaimed Oil Is As Good As New Oil. Knowing that, today finds hundreds of successful fleet owners pocketing extra dollars. Their Skinner Reclaimers take formerly wasted crankcase drainings and convert them into oil that is as good as new. If this were not true, fleet owners would not risk harming their engines. They could not take the chance. There is absolutely no element of risk in putting Skinner reclaimed oil into your motors any more than in using the highest quality of new oil. Here's still another letter which echoes the indisputable experience of hundreds of Skinner owners—

"We are glad to state that after six months' operation this machine has proved perfectly satisfactory and has lived up to every claim for it.

"We are engaged in the Ready Mixed Concrete business, sand and crushed stone and other building materials, and operate a fleet of 2½-Ton Hug trucks for the purpose of hauling. We use a great deal of oil in our rock crusher and operate a number of small trucks and passenger cars. We are reclaiming all of our oil by this process and find that it averages about 7c per gallon. This, you will readily see, makes this a very economical process, and we are of the opinion, formed from actual experience, that this reclaimed oil is as good—if not better—than new oil. We are highly pleased with this Skinner machine and its operation".

Signed Big Rock Stone & Material Company.

If you are still unconvinced, all we ask is an opportunity to prove to your complete satisfaction how a Skinner Reclaimer can really save money for you. Your operating conditions certainly are not unlike those of hundreds of Skinner owners who are cutting their oil bills 40% to 60%. It's hard to believe that you can afford to ignore this offer to give money-saving facts. Mail the coupon today!

CLIP *and* MAIL TODAY

SKINNER OIL RECLAIMERS

Made by Skinner Motors, Inc., Pioneers in Oil Reclamation, 2229 Dalzelle, Detroit, Mich.

SKINNER MOTORS, INC., Pioneers in Oil Reclamation,
2229 Dalzelle at 14th St., Detroit, Mich.

Please send us, without obligation, complete information about Skinner Oil Reclaimers. Also tell us definitely with facts and dollar-and-cents figures what a Skinner Reclaimer will save us in cash and oil.

We purchase approx. ..... gallons of oil per month.
We drain approx. ..... gallons of oil per month.
We pay ..... per gallon of oil.
Our electric current rate is ..... c per kilowatt hour.

Signed ..... Position ..... 9—32

By H. V. Middleworth

Supt. of Operations, Transportation Dept., Consolidated Gas Company of New York

Self-Maintenance Vs. "Farming Out"

Fleet Maintenance Man Gives Us an Interesting Analysis of This Important Question from His Experience — "Pros and Cons" are Carefully Weighed

THE conditions under which motor vehicles operate are so varied that it would be extremely difficult to arrive at any fixed or definite rule governing the method of maintaining motor vehicle fleets. Furthermore it would be difficult to determine what the minimum number of vehicles should be to justify the establishment of a self-maintnance organization.

We speak of large operators and small operators, but just where to draw the line between the two is without doubt a difficult problem. Suppose we call a large operator one who operates 40 vehicles or more and a small operator one who operates less than 40 vehicles. It is obvious that the large operator with equipment separated into small fleets in remote localities would bring his problem into the same class as a small operator.

In viewing this question from a number of angles, it might be well to consider some of the outstanding advantages and disadvantages of self maintenance. In the first place, in a self maintenance shop the work is constantly under the direct supervision of the person responsible for the maintenance of the fleet.

Secondly, it is not necessary to carry more than a limited supply of spare units, repair parts, accessories, materials and supplies as they may be procured direct from the service station or other source of supply as occasion may require.

Thirdly, self maintenance repairs might not necessarily be quite so thorough and the vehicle still be perfectly safe to operate, while service station repairs are generally more extensive.

For instance, an operator making his own repairs might make use of slightly worn parts which would render his vehicle entirely safe and in fit condition to operate for considerably more mileage. The service station in most instances, as a matter of policy, would replace a slightly worn part with a new part even though the worn part might still be good for many more miles of use.

In considering some of the disadvantages of self maintenance, I desire to call attention to a situation which may occur from time to time when the self maintained repair shop becomes overburdened. The shop may be working to the limit on jobs already in, when by reason of accident or mechanical failure, a surplus of work may suddenly come in unexpectedly. This condition might require that one or more jobs wait a day or even longer before work could be started on them, which means that the vehicles would be out of service just that much longer.

If they were sent to the service station, arrangements might be made to have such work given precedence over other work considered less important, thereby lessening the time out of service.

Before any definite conclusion is reached regarding the advisability of service station maintenance, a careful study should be made of the conditions under which the fleet operates.

If it is found that it is broken up into small fleets of say 40 vehicles or less, operating in several separate and remote districts, necessitating many miles of travel to and from a central repair station, then self maintenance from an economical point of view would seem out of the question.

If after careful study, it is decided that service station maintenance is desirable, a thorough survey should be made of the service-station facilities available in the districts from which the vehicles operate. In this connection it is generally understood that service-station managers are glad, and usually eager, to get work from responsible concerns. They are also willing to allow a satisfactory discount on work done for such concerns.

Henry V. Middleworth, who gives his unbiased viewpoints on the subject of Self-Maintenance vs. Service Station Maintenance.

It is understood that work of this nature is frequently given precedence over other work that is considered of less importance. Arrangements may be made with service stations to do work at night, thereby eliminating the necessity of laying up the vehicles for repairs during the daytime. Arrangements may be made also to have the painting done over week-ends in order that time out of service may be reduced to a minimum.

Service station maintenance with regard to passenger vehicles as well

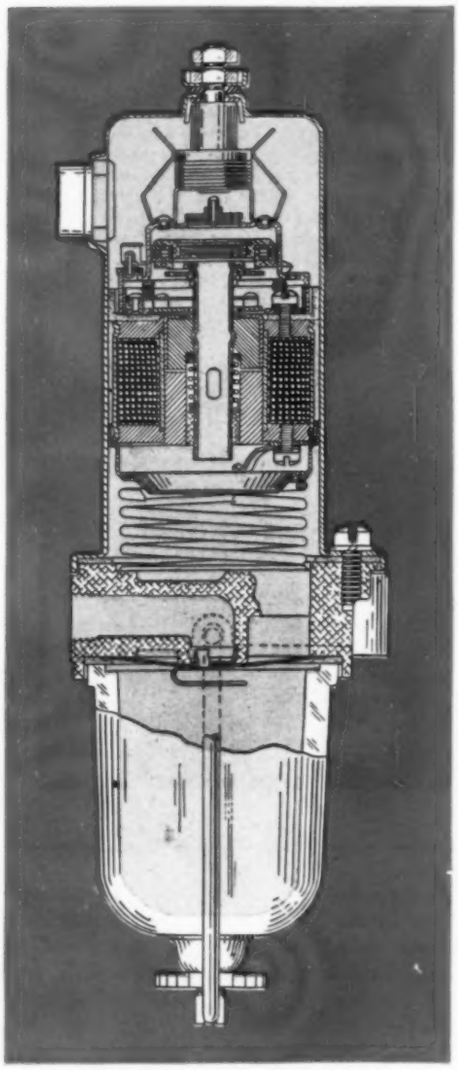
(*Please turn to page* 20)

No CONTACT POINTS DIAPHRAM OR BELLOWS

in the new

STEWART WARNER

Electric FUEL PUMP



Model 544 Available for 6 or 12 volts.

Equipped with glass or steel sediment bowl.

In gang assemblies, any unit may be cut out—without interfering with the operation of the active pumps.

95% of the Cause of Electric Fuel Pump Failure Now Banished

Where schedules must be met and service cost reduced to a minimum, the new Stewart-Warner Electric Fuel Pump fills the bill.

It delivers more fuel at less current cost than any other electric pump built—only .8 amperes at maximum capacity of 25 gallons and .2 amperes with motor idling. Tests equivalent to 200,000 miles of operation demonstrate the outstanding dependability of these pumps.

You can forget your fuel delivery problem with this pump, for it delivers under all conditions of weather. Starts instantly in the coldest weather and delivers full capacity—and you need never fear vapor lock though you cross the hottest desert sand.

Easily installed on the line singly or in gangs, to replace or for alternate use with present fuel system. It's the best and most economical schedule insurance you can buy. Investigate. See one of our service branches or write Stewart-Warner, 1826 Diversey Parkway, Chicago, Illinois.

ANOTHER STEWART-WARNER PRODUCT THAT KEEPS PACE WITH TODAY'S DRIVING NEEDS

BOTH SIDES *of an* IMPORTANT QUESTION *(Continued)*

as commercial vehicles is usually found to be satisfactory.

Opinions differ widely upon the subject of maintenance. One large operator who formerly maintained a well equipped central repair station now farms out all major repairs to service stations. This fleet was scattered over a considerable area, which necessitated many miles of travel to and from the repair station, which represented time consumed by travel as well as time out of service, both of which items are worthy of consideration.

Some of the savings claimed to have been realized by this change of policy may have been brought about by retiring vehicles on a time or mileage basis before they have completed their economic life and replacing them with new vehicles.

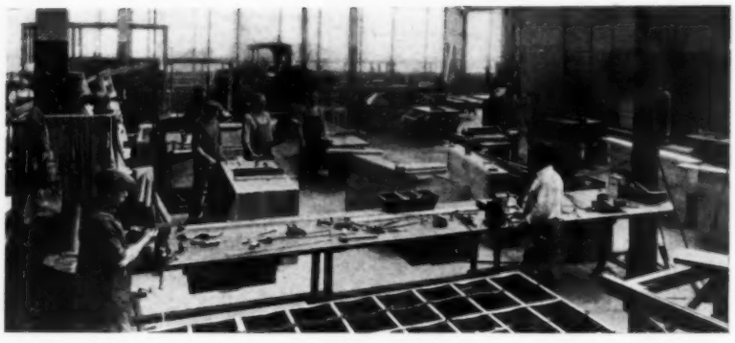
still satisfactorily and economically maintained. This operator was asked how much longer he expected these trucks to operate economically and he replied, "As long as I am able to get parts to repair them."

In summing up the situation, it seems to me that the vital factor affecting the successful and economical operation of an automobile fleet repair station is the careful selection of the personnel. If an operator has a sufficient number of vehicles so centralized as to justify the establishment of a self-maintained repair shop and if he employs a supervisory force equal to that of the manufacturer's service station, there can be very little doubt that self-maintenance is more desirable than service station maintenance.

If on the other hand, an operator has not a sufficient number of vehicles so centralized or, in other

THE unit replacement system is followed in the centralized maintenance of the Consolidated Gas Company's fleet. Here we have the motor and transmission department, where engines and transmissions are overhauled, during spare time, while replacement units are being used in service. Cylinder grinding is farmed out to specialists in this work.

A COMPLETE woodworking division is a part of the Consolidated Gas Company's "153rd St. Reconditioning Station." In this department, a portion of which is shown here, every type of body repair work is done. Inasmuch as the fleet is quite large and varied, a considerable amount of different types of work is called for, and the shop is able to take care of them by being properly manned and equipped.



I have in mind a certain well known make of trucks which have been retired on a time basis of six years and had covered only from 29,000 to 40,000 miles. This practice is extremely difficult to understand when we consider another large operator who operates 96 trucks of the same well known make, 49 of them over a period of 11 years covering a total of 6,753,670 miles or an average of 137,830 miles per truck, 25 of them averaging 118,807 miles per truck, eight averaging 128,209 miles per truck, 12 averaging 167,074 miles per truck, two averaging 153,895 miles per truck, and two of them over a period of 16 years averaging 222,876 miles per truck.

All of these trucks are still in operation; they have always been and are still self-maintained. This fleet of trucks is kept in "spick and span" condition at all times and it is claimed by the operator that they are

words, if a greater portion of his fleet is operating from several separate and remote districts which would necessitate many miles of travel to and from a central repair station and an unreasonable period of time out of service, it seems reasonable to consider service station maintenance.

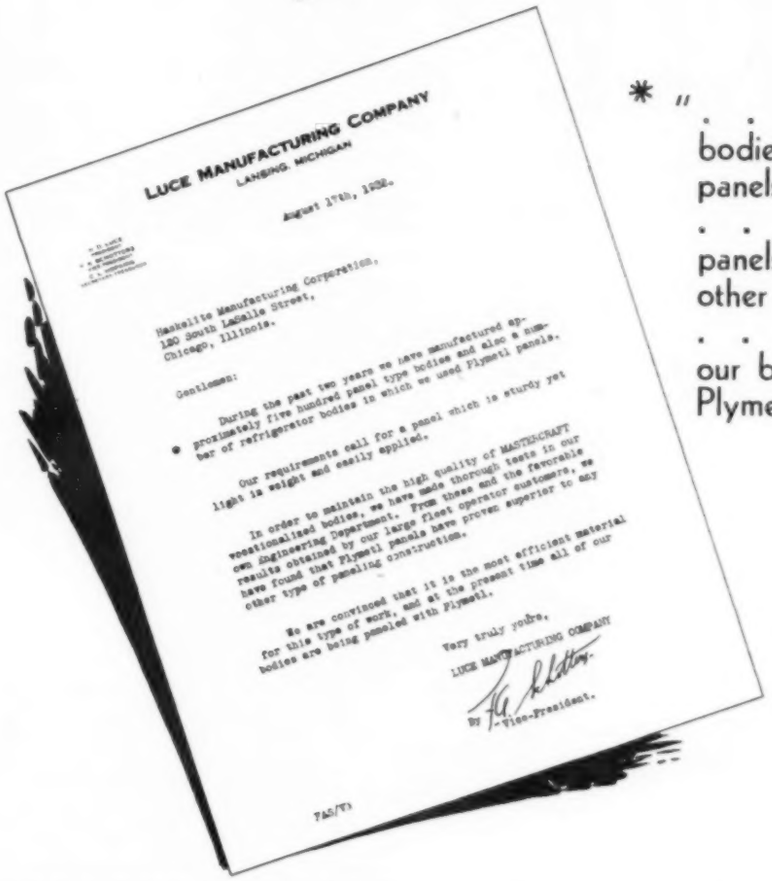
Editor's Note: Many of our readers, after perusing Mr. Middleworth's remarks, will wonder just how his firm, the Consolidated Gas Company of New York, services its fleet of automotive vehicles.

A description of the service policies of this fleet was given, by Mr. Middleworth, in the January, 1929 issue of FLEET OWNER. For the benefit of those who do not remember, or who did not see this issue, we might add that the Consolidated Gas Company's fleet maintenance has been centralized in 1925.

(Please turn to page 44)

500

PLYMETL PANEL BODIES . . .



LUCE MANUFACTURING COMPANY
LANSING, MICHIGAN

August 17th, 1932.

Haskelite Manufacturing Corporation,
120 South LaSalle Street,
Chicago, Illinois.

Gentlemen:

During the past two years we have manufactured approximately five hundred panel type bodies and also a number of refrigerator bodies in which we used Plymetl panels.

Our requirements call for a panel which is sturdy yet light in weight and easily applied.

In order to maintain the high quality of MASTERCRAFT vocationalized bodies, we have made thorough tests in our own engineering Department. From these and the favorable results obtained by our large fleet operator customers, we have found that Plymetl panels have proven superior to any other type of paneling construction.

We are convinced that it is the most efficient material for this type of work, and at the present time all of our bodies are being paneled with Plymetl.

Very truly yours,
LUCE MANUFACTURING COMPANY
By F. A. Luce, Vice-President.

FAL/FJ

* " . . . five hundred panel type bodies in which we used Plymetl panels.

. . . we have found that Plymetl panels have proven superior to any other type of paneling construction . . . at the present time all of our bodies are being paneled with Plymetl."

PLYWOOD
HASKELITE
PLYMETL

HASKELITE MANUFACTURING CORPORATION

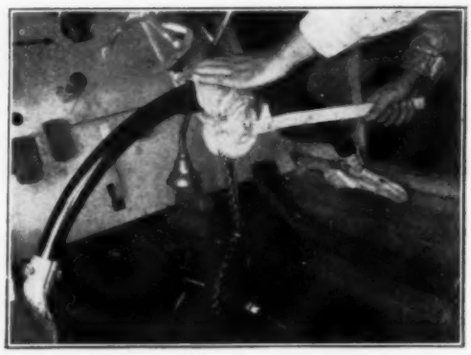
120 South La Salle Street, Chicago, Ill.

New York Distributor:
Esdorn Lumber Corporation

Boston Distributor:
Cutter, Wood & Sanderson Co.

Clutch Maintenance

How to Do It



When to Do It

THE fleet maintenance man called upon to install new clutch plates and other parts, as well as to analyze a chattering, grabbing, sticking, or slipping clutch, rapid wear, noisy transmission, etc., should before installing new parts do the following:

On Multiple Plate Clutches:

1. Examine condition of clutch shaft pilot bearing.
2. Examine condition of engaging members in the clutch driven and driving drum.
3. Examine the surface condition of the pressure plate.
4. Examine condition of rear bearing of the clutch shaft.

It is essential that the teeth on the inner clutch hub be thoroughly cleaned with a wire brush. All hardened grease and other foreign material must be removed. The same cleaning should be done with the teeth of the driving clutch drum.

On Single Plate Clutches:

1. Examine condition of clutch shaft pilot bearing.
2. Examine surface condition of driving area of flywheel.
3. Examine condition of all springs.
4. Examine condition of throw-out bearing and clutch shaft bearing.

If available, these tests for run-out and wear should be made with a dial indicator, as shown in the accompanying illustrations.

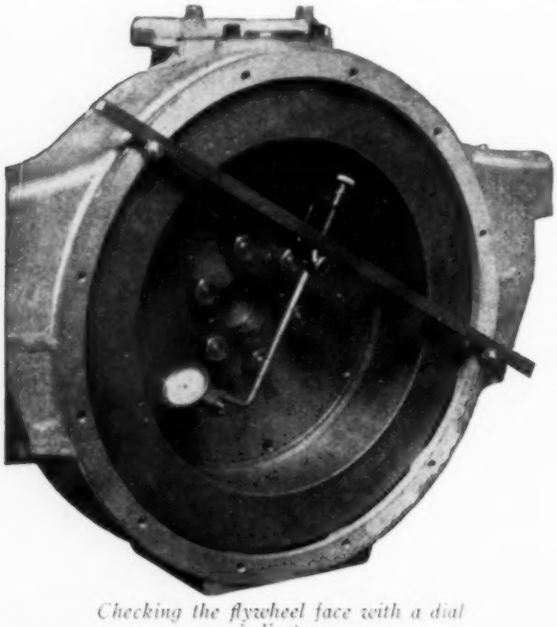
Before assembly is attempted, it is very good practice to measure the alignment of bell housing to center line of crankshaft, if dial indicators are available.

Observe carefully the position of the hub of the old plate when it is removed from a single plate clutch. All clutch plates have a splined hub longer on one side than the other. Note whether the long or short end of the hub faces the flywheel.

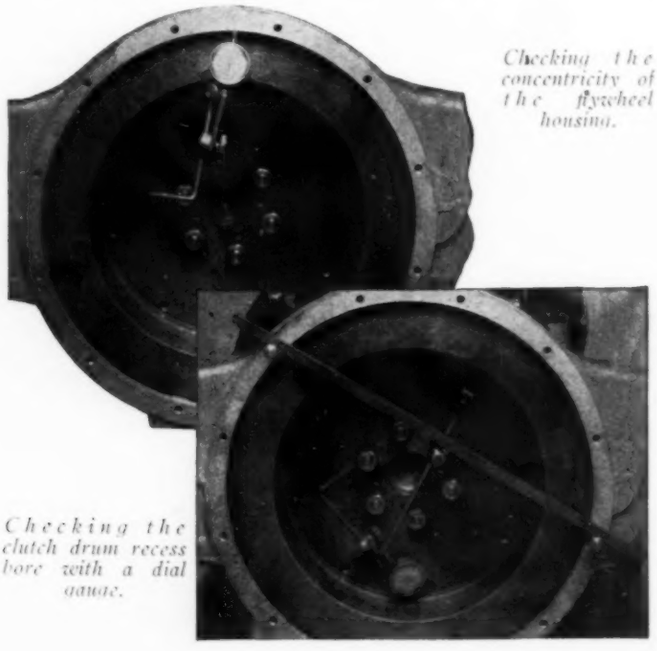
If installed in an inverted position, the long end of the hub may ride the clutch pilot bearing. Under such a condition when the engine is started not only is there danger of destroying the new clutch plate, but the whole assembly as well.

When replacing a clutch plate, should the pressure plate be found scored or worn, a new one should be used. Installing a new clutch plate with new facings will only temporarily correct the clutch if it is reassembled with such a pressure plate.

When taking down a multiple disc clutch for new plates see that the teeth of the inner clutch drum are not damaged to cause burrs. Handle the driving

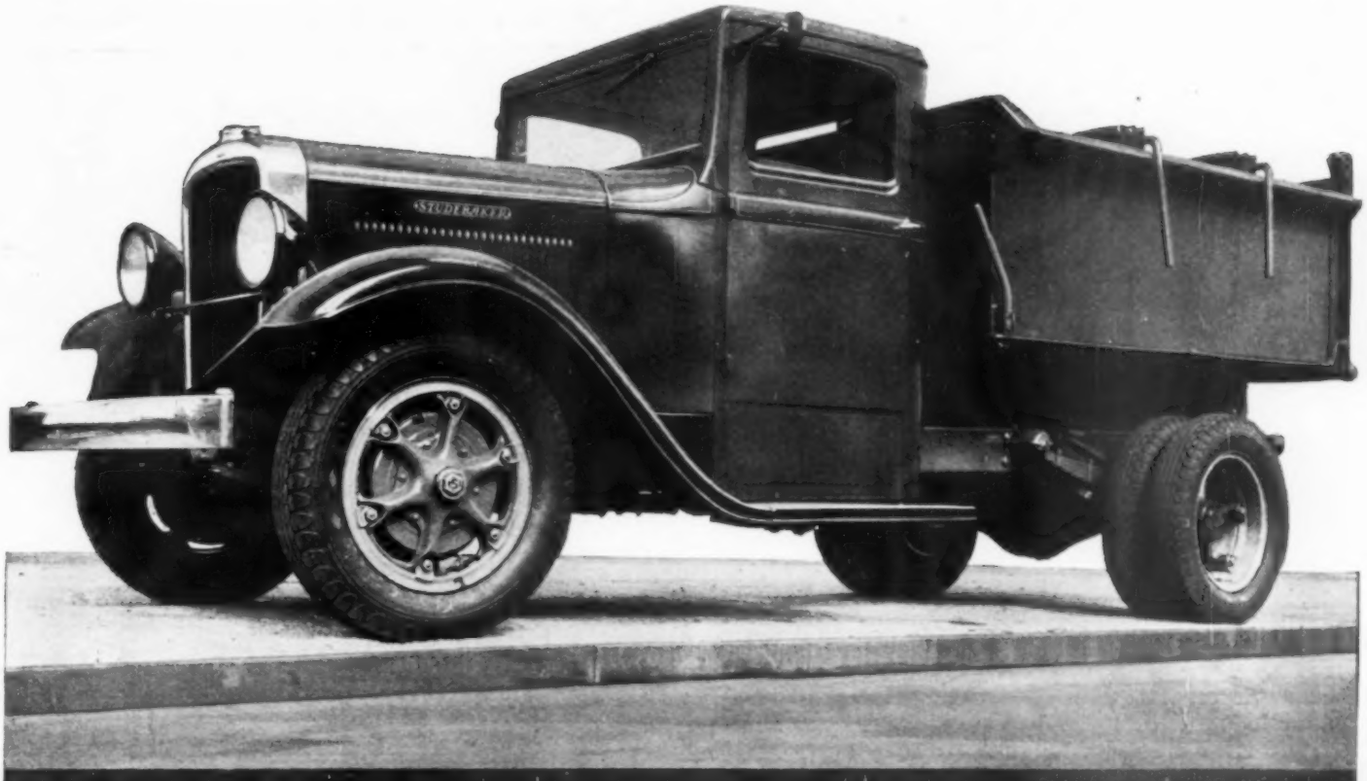


Checking the flywheel face with a dial indicator.



Checking the concentricity of the flywheel housing.

Checking the clutch drum recess bore with a dial gauge.



This truck *makes money!* That makes it a *good truck!*

A VANITY CASE—a color scheme—90 miles an hour—automatic shock absorbers or any one of a hundred other features may be the determining factor in the purchase of a motor car.

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1½ TON CHASSIS
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The most powerful truck ever sold at such low prices.

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Studebakers are *profit-makers*

Say "I saw it in FLEET OWNER"—It Helps!

A "HOW-TO-DO-IT" ARTICLE (*Continued*)

clutch drum in the same manner. It should never be hammered upon with a blunt tool. It will warp the driving clutch drum out of round, making it impossible to install new plates.

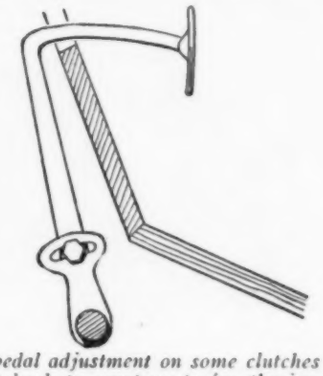
When doing general clutch service work, including the installation of clutches, proper equipment will greatly speed up this work. A compact transmission hoist, together with a telescoping clutch pilot tool, are shown on these pages. The hoist prevents the transmission from hanging on the clutch shaft without support, thus distorting the clutch pilot bearing and is valuable in removing the entire assembly as well as reinstalling it. The clutch pilot tool is telescoping and the tool enters the bore of the clutch pilot bearing while the larger tube supports the clutch hub, making the entire assembly concentric and insuring perfect alignment.

In a single plate type clutch great care must be taken to centralize the plate. The tool mentioned or a clutch shaft is inserted through the clutch, bringing the new plate into alignment, after which the clutch cover is bolted permanently to the flywheel. Never remove the pilot tool until the clutch cover is securely fastened.

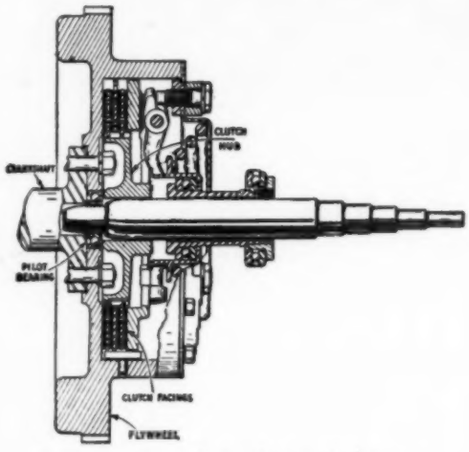
When a new clutch plate of the single type is installed, particularly on clutches where the clutch adjustment is controlled by adjusting the clutch pedal arm, it is imperative after the new clutch plate is installed, that no attempt be made to engage or disengage the clutch, until a new adjustment is made of the clutch pedal arm to compensate for the increased amount of throw necessary to effect enough clearance of the pressure plate to allow proper release of the clutch.

In clutches of the single plate type, adjustable by moving the pressure plate adjusting ring, the latter should be loosened to its farthest point and then a new adjustment made when the new clutch plate has been installed. This secures the proper amount of "throw" in the clutch for releasing but at the same time prevents slippage.

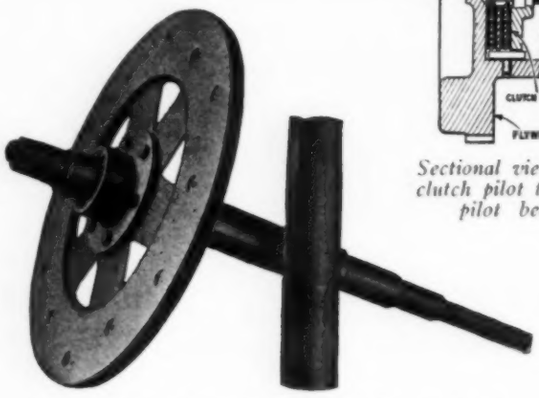
The test can be made by adjusting the clutch to a point assumed to be correct, starting the motor, disengaging the clutch, putting the transmission in high speed, setting the hand brake and then easily engaging the clutch, noting how much slippage occurs before the engine is stalled.



The pedal adjustment on some clutches must be set back to compensate for the increased thickness of new plates and facings.



Sectional view of clutch showing how a clutch pilot tool aligns the clutch with a pilot bearing in the flywheel.

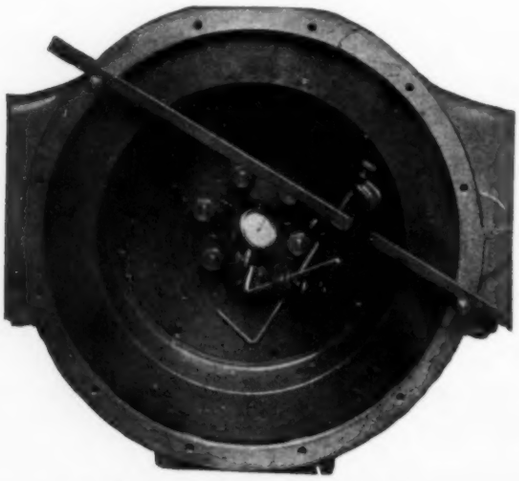


A telescoping tool serving as a pilot for accurately centering the clutch hub before the transmission is installed.

In both single plate and multiple disc clutches, the manufacturers are equipped to furnish plates that are perfectly flat and of correct thickness. Correct thickness is very important because it insures the proper amount of "throw" necessary to make a satisfactorily operating clutch.

In addition to the usual line of floor tools and hand tools, the following items of equipment are useful in performing various maintenance operations on clutches. This equipment is especially desirable in fleet shops where it is necessary to perform the work within a given time:

1. **Transmission Hoist**
   Useful in removing and replacing clutch and transmission assembly. Prevents transmission from hanging on the clutch shaft without support. Makes alignment and assembly much easier.
2. **Clutch Pilot Tool**
   A telescoping tool which enters the bore of the clutch pilot bearing while the larger tube supports the clutch hub, making the assembly concentric and insuring perfect alignment.



Testing the clutch pilot bearing bore.

(*Please turn to page* 44)

"None too soon, either . . . it really *needs* 347B"

Part of the business of fleet operation is to *anticipate* needed replacements—and make them in time to avoid emergency lay-ups and costly schedule breaks.

Gambling on a few more miles with ignition cables that do not carry a full load of hot current to the plugs is false economy.

347B is the Packard Super-Duty Cable with multiple resistance made especially to withstand the most grueling truck and bus service. When you replace with 347B you prevent the annoyance and high cost of frequent and premature ignition failure.

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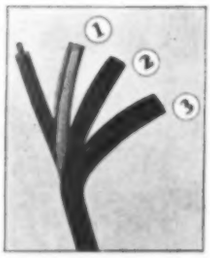

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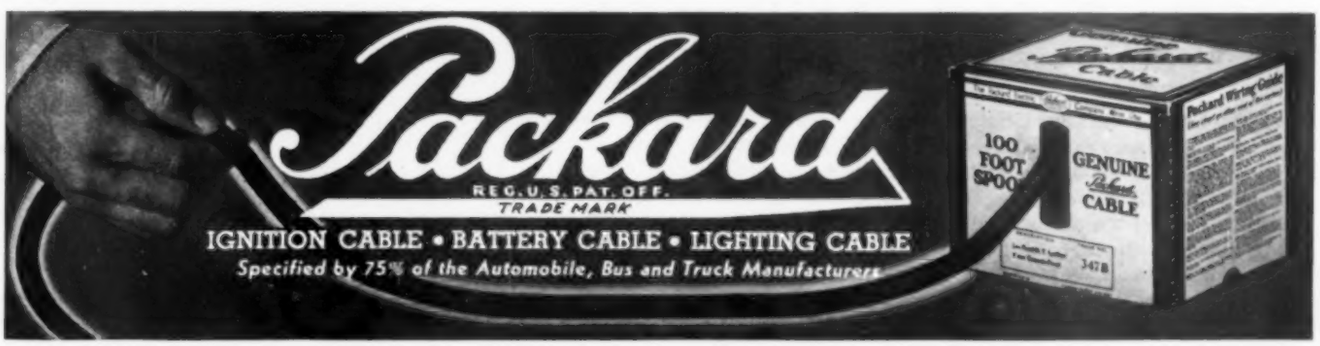
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Specified by 75% of the Automobile, Bus and Truck Manufacturers
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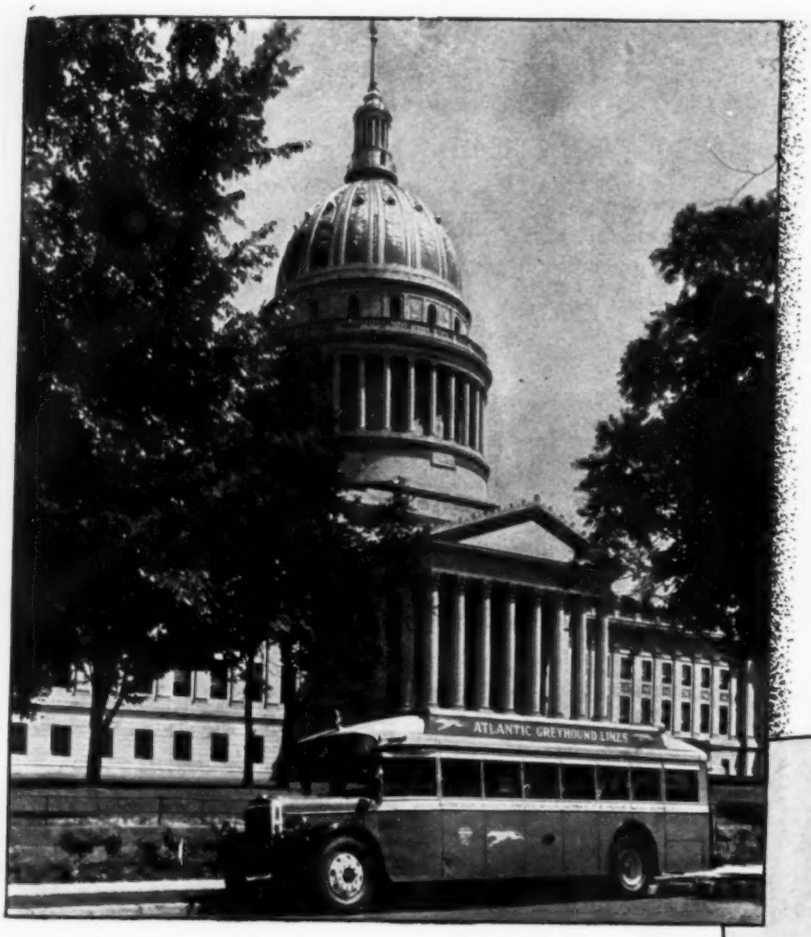

NOT A S
CUT BY BI

(Left) A Bus of the Atlantic Greyhound Lines equipp with Libbey·Owens·Ford Safety Glass, in front of t new Central Unit of the State Capitol in Charlesto West Virginia, which is glazed with Libbey·Owens·Fo Polished Plate Glass. Architect: Cass Gilbert, New Yo

AUTOMOBILE INSURANCE
LIABILITY—PROPERTY DAMAGE

FIRE—THEFT—COLLISION
AND PLATE GLASS

AMERICAN
FIDELITY AND CASUALTY Co.
INCORPORATED
RICHMOND, VIRGINIA

August 8th, 1932

M. S. ALDRICH, AGENT
414 CHARLESTON NAT'L BK. BLDG.
CHARLESTON, W. VA.

Mr. George S. Engle, Assistant Gen. Mgr.,
Atlantic Greyhound Lines, Inc., of W. Va.,
Charleston, West Virginia.

Dear Mr. Engle:

In checking over the accident record of the Atlan
Greyhound Lines, Inc., of West Virginia, I am very happy
note that there has been a decrease of 8% in the loss ra
during the last nine months. This would indicate pretty
nearly 1% a month, and there is no question in my mind t
that the improvement in your inspection and maintenance
methods have been the prime contributing factor.

Collisions where other vehicles have either skid
or crashed into the front or side of the buses have bee
materially reduced, and the claims of passengers arisin
out of this class of accident have been reduced to a
negligible figure.

I attribute considerable of this savings to your
of Libbey-Owens-Ford Safety Glass for the reason that
windows in the bus have been cracked or broken in almo
everyone of these accidents, there has not been a sin
claim where passengers have been cut by flying glass.

All of which conclusively demonstrates the pro
that most accidents are avoidable. I compliment you
showing that your men have made and solicit your cont
support and cooperation to the end that there may be
and more substantial reductions in the loss ratio.

With kind regards, I am

Yours very truly,

M. S. Ald

State Agent

MSA:SH

"We Serve: Therefore We Grow"

"I attribute considerable of this savings to your use of Libbey·Owens·Ford Safety Glass for the reason that, while windows in the bus have been cracked or broken in almost every one of these accidents, there has not been a single claim where passengers have been cut by flying glass."

—Excerpt from letter at right.

●

Libbey·Owens·Ford Safety Glass is used by Packard, Graham, Studebaker, Franklin, Reo, Willys, Willys-Knight, Ford, Cadillac, La Salle, Lincoln and Nash; and in Dietrich and LeBaron Custom Bodies, Reo Speed Wagons, Twin Coaches, Brill Trolley Buses, Cincinnati Trackless Trolley Coaches, Bender Bus Bodies, Hackney and Springfield School and Passenger Bus Bodies, White School Buses, York-Hoover School Bus Bodies, Crown School and Motor Coach Bodies and Ford School Buses

A SINGLE PASSENGER
Y BROKEN, FLYING GLASS

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l in Charleston,
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ilbert, New York

and this is why . . .

From an unretouched photograph taken by Underwood & Underwood at Comiskey Park, Chicago, Ill.

—COLLISION
TH GLASS

y Co.

ord of the Atlantic
I am very happy to
in the loss ratio
indicate pretty
ion to my mind but
and maintenance
factor.

have either skidded
s buses have been
assengers arising
reduced to a

savings to your use
the reason that while
broken in almost
not been a single
flying glass.

strates the proposition
compliment you on the
licit your continued
t there may be further
loss ratio.

urs very truly,

L. Aldrich

State Agent

row"

In the dramatic demonstration above, "Lefty" Gomez, the New York Yankees' pitching sensation, threw a baseball at an L·O·F Safety Glass windshield with all the steam of his powerful arm behind it. It actually *bounced back.* The glass did not shatter and fly; did not set free those danger-dealing pieces that cause ugly cuts . . . and worse. Safety Glass provides for common carriers an assurance *against* claims as vitally important as insurance *covering* claims.

• • •

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LIBBEY · OWENS · FORD
SAFETY GLASS

Servicing Bendix-Hydraulic Brakes

By W. A. Royce

(1932 Types)

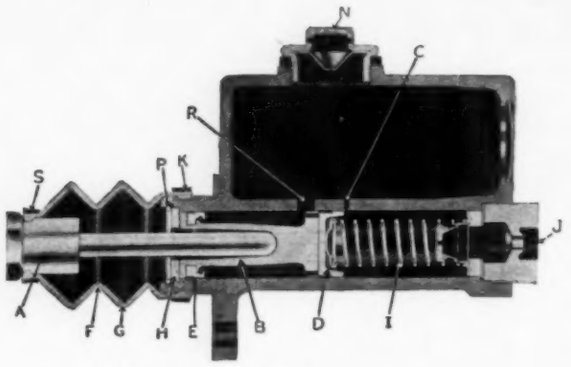


FIG. 1

SOMETHING new in the way of brakes has made its appearance on 1932 automobiles—a Bendix two-shoe, single-anchor-pin, duo-servo brake, actuated by hydraulic force. The braking mechanism has been developed by the Bendix Brake Company, subsidiary of the Bendix Aviation Corporation, and the hydraulic cylinder controls are of the well known Lockheed design.

The brake shoes are brought in contact with the drums by means of a column of liquid forced through pipes when the brake pedal is depressed. This liquid transmits pressure to each brake shoe by displacing pistons in master and wheel cylinders. Because the pressure is equal in all parts of the system, no braking action can take place until all shoes are in contact with the drums.

The system consists of a master cylinder (Fig. 1) in which hydraulic pressure is originated; a cylinder in each wheel (8 in Fig. 5) which operates the brake shoes; a supply tank by which the fluid is maintained at constant volume, and the "line," consisting of copper tubing and flexible hose, connecting the master and wheel cylinders.

When depressed, the brake pedal moves a piston in the master cylinder, thus displacing the brake fluid from the master cylinder and forcing it through the line into the cylinders at each wheel. The fluid enters each of the wheel cylinders between their opposed pistons, causes them to move outward against the brake shoes and brings the shoes in contact with the drums. As pressure on the pedal is increased, greater hydraulic pressure is built up within the wheel cylinders and consequently greater force is exerted against the shoes.

When pressure on the pedal is released, springs on the brake shoes return the wheel cylinder pistons to their normal or "off" positions, thus forcing the brake fluid back through the line into the master cylinder.

A combination type master cylinder is used in the new brake system. It consists of a supply tank cast integral above the master cylinder barrel, in which the standard hydraulic compensating features are incorporated. This unit performs two functions. Primarily, it maintains a constant volume of fluid in the system at all times regardless of expansion or contraction from heat or cold. The secondary function is replacement of fluid in the system to compensate for any loss due to gravity seepage.

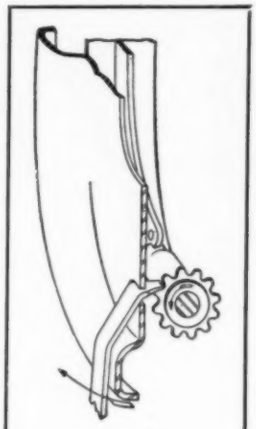


FIG. 2

The return to "off" position of piston "B" and cup "D" is much faster in displaced volume than return of fluid from the line through fitting "J." A momentary vacuum is created in the cylinder barrel and additional fluid is drawn into the system through holes in piston "B" past the lip of cup "D." The fluid returns more slowly from the wheel cylinders and line to the master cylinder barrel and any excess is by-passed through port "C" into the supply tank.

Thus the master cylinder barrel is constantly filled with fluid and ready for brake applications, no matter in how rapid sequence they come. Secondary cup "E" prevents fluid leaking out of master cylinder into boot "G."

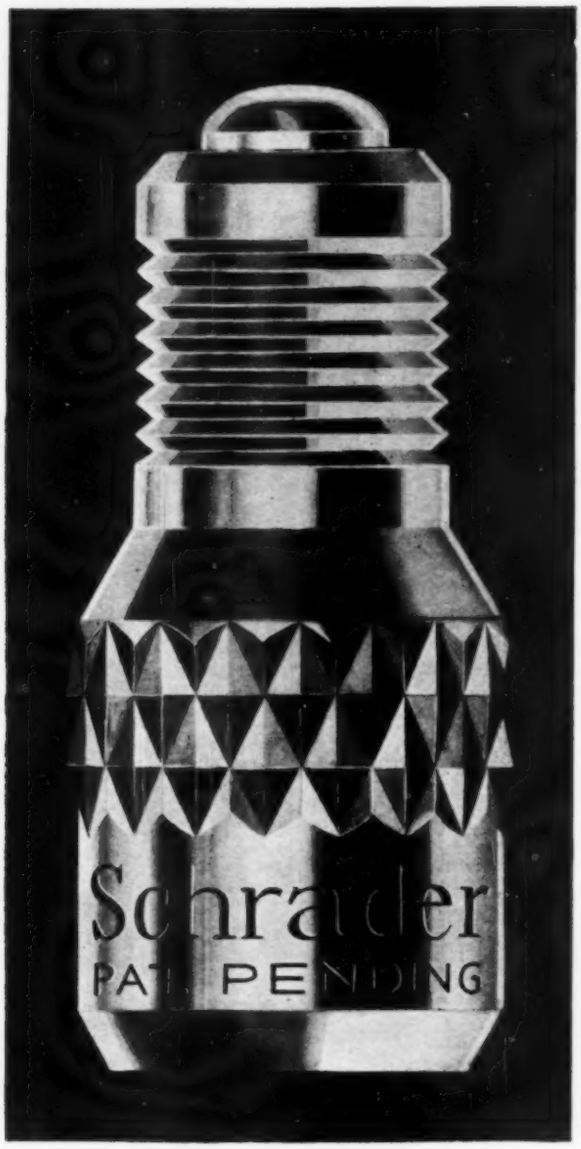
For proper pedal adjustment it is imperative that rod "A" be adjusted for clearance where it seats in piston 'B." Otherwise port-hole "C" may be blocked by cup "D" and compensating action of the master cylinder destroyed. Cup "D" must be clear of port "C" when piston "B" is at its "off" or returned position. This can be determined by making sure there is about ½-inch free movement of the brake pedal before the pressure stroke starts.

Ordinarily a complete brake adjustment is not required with the new type Bendix brake. This is only necessary when new shoes have been installed or in cases where shoe adjustment to compensate for linnig wear proves inadequate. Otherwise, it is recommended that the anchor pins be left alone.

Bendix engineers recommend the following procedure for general adjustment of the hydraulic-actuated single anchor brake:

1. Jack up all four wheels and make sure parking brake cross shaft is returning to a fully released position.
2. Remove inspection hole cover from brake drum. Loosen the eccentric adjustment (16 in Fig. 3) and insert a .014-inch feeler gauge between lining and drum about 1½ inches from the adjusting screw end of secondary shoe lining as indicated in Fig. 5. Turn the eccentric adjustment in the direction the wheel revolves when the car is going forward until the .014 gauge is snug and then tighten lock nut on eccentric adjustment.
3. Try an .008-inch feeler gauge at a point 1½ inches from the anchor pin end of the secondary shoe lining as indicated in Fig. 5. Clearance here should not vary more than .003-inch on any of the four wheels.

(*Please turn to page 30*)



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NOBODY needs to tell you that under inflation is the greatest thief of tire mileage. And the big bone of contention when the matter of "adjustments" by the dealer comes up. Save the mileage and avoid controversy . . . . Make inflating and gauging easy for your drivers and service men, and you minimize tire-pressure neglect.

Hand soiling and time-wasting fussing with removable valve caps end when tire valves are equipped with Schrader Dublchek Valve Caps. They're permanent . . . . There's nothing to unscrew and replace . . . . There's an extra valve in the cap itself. Snap on the chuck and let the air in. Apply the gauge and read the pressure. That's all.

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FIFTEEN superior features and Schrader engineering precision make it the best valve cap of its type. Permanent—can't be lost. Effectively shuts out dirt, dust and grit. A double check against loss of air—even should valve core become damaged. Guaranteed air-tight up to 250 lbs. if affixed according to directions. *Saves four operations in inflating every tire.*

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Be sure it's a Schrader—Look for the name

INFLATE AND TEST PRESSURE THROUGH VALVE CAP . . . No dust and valve caps to remove and replace.

A "HOW-TO-DO-IT" ARTICLE (*Continued*)

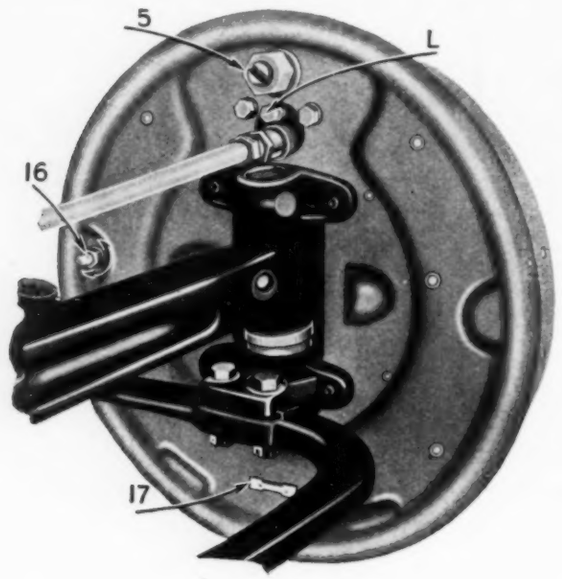

FIG. 3

If it does, it will be necessary to relocate the anchor pin.

This is accomplished by first disconnecting each parking brake cable at its respective cross shaft lever. Then loosen anchor pin lock nut (Fig. 4) and rotate anchor pin in the same direction the wheel revolves when the car is moving forward, meanwhile re-adjusting the eccentric as necessary to give the specified clearances of .014 inch at the adjusting screw end and .008-inch at the anchor pin end of the secondary shoe lining. Hold anchor pin and tighten nut as much as possible with a 16-inch wrench. Re-connect parking brake cables with cross shafts.

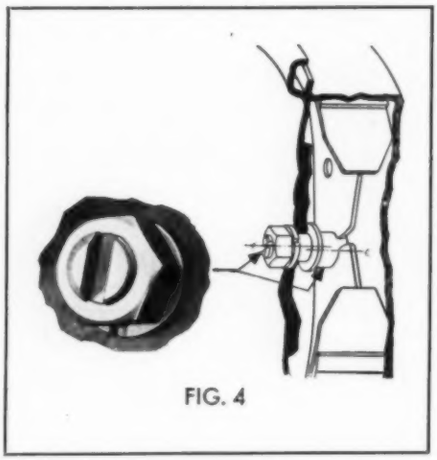

FIG. 4

4. Remove adjusting hole cover (17 in Fig. 3) and expand brake shoes one inch at a time with a tool at adjusting screw (Fig. 2) until lining comes in contact with brake drum.

Inspect parking brake cables. If loose or unequal all four cables should be adjusted as follows: Back off each clevis lock nut and remove clevis pin to disconnect cables from cross shaft levers; lubricate clevis pin with graphite grease; adjust clevis until clevis pin can be easily entered through clevis and cross shaft lever holes, meanwhile pulling on the cable to remove slack and back-lash at the shoe operating levers (15 in Fig. 5); insert clevis pin and lock with cotter key; tighten lock nut and release adjusting screw at each wheel exactly the same number of notches, not to exceed eight.

When adjusting parking brake cables, care should be used *not* to expand either primary or secondary shoes *away* from the anchor pin (5 in Fig. 5). Hence, after disconnecting cables it is necessary to expand the brake shoes in each rear wheel at adjusting screw (Fig. 2) until the wheels are locked.

5. Lower the car and make final check on brake testing machine or road. When making final adjustments always *loosen* adjusting screw on *tight* brakes rather than tighten screw on loose brakes. This prevents the car going into service with some one brake too tight. Replace inspection and adjusting screw hole-covers and the adjustment is complete.

Construction of the new brake is clearly shown in Fig. 5. This is a wheel-side view of a left rear brake with drum removed. In re-assembling brake shoes (3 and 4) into their proper location in the backing plate, it is necessary to see that all shoe return springs are connected correctly. Primary and secondary shoes are marked by the letters "P" and "S." The primary shoe engages with the brake drum first during a forward application of the brake and transfers servo movement to the secondary shoe.

The spring arrangement illustrated in Fig. 5 is always necessary so the primary shoe will be applied first. Hence, be sure the secondary shoe spring (1) is always connected to the secondary shoe between hole (10) and anchor pin (5) at each wheel.

In re-assembling the adjusting screw (2) it is necessary that pivot nut (14) which has a groove around the outside, be assembled to the left of the adjusting screw. The notched wheel must engage with the shoe to the mechanic's left as he faces the brake from the adjusting screw side. To remove hold-down springs (13) press the outer cupped washer in toward the brake shoe and revolve 90 degrees.

The eccentric type anchor pin used in the new brake is illustrated in Fig. 4. The outer end of the pin is shown with an indication that the higher side of the screw-driver slot corresponds with the high side of the eccentric section of the pin. By turning the anchor pin in either direction the lining is brought in contact with the brake drum.

However, it is recommended that when making anchor pin adjustments all four anchor pins be revolved in the same direction the wheel revolves when the car is going forward. When such adjustment is being made, first turn the anchor pin in a forward direction until a decided brake drag is felt. Then release it in opposite direction

(*Please turn to page 46*)

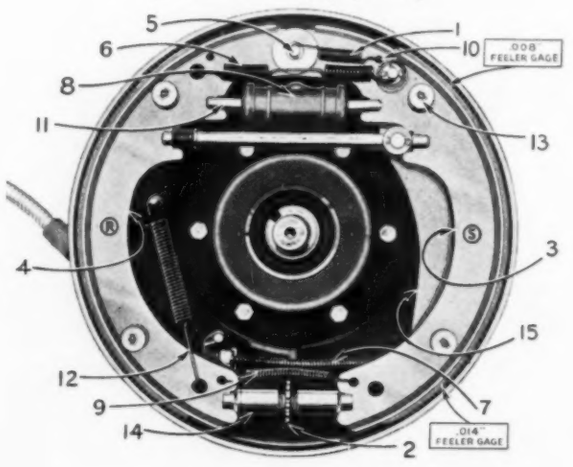

FIG. 5

SO LONG AS..

service brakes hold, keep their perfect adjustment . . . and nothing goes wrong . . . you are fairly safe against emergencies.

BUT IF SERVICE BRAKES FAIL

an inefficient "parking brake" is worse than useless. You need a powerful emergency brake in reserve—one that will handle the entire load . . . on the level or down hill . . . at any speed.

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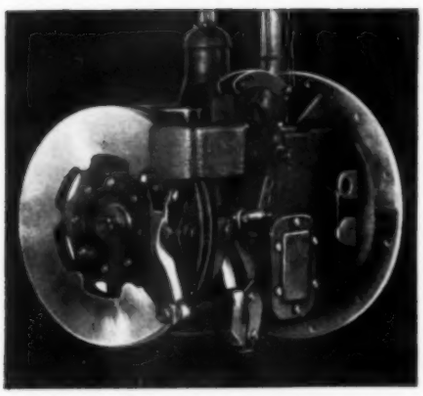
Exhaustive tests prove TRU-STOP is a *real* emergency brake. TRU-STOP Brakes are self-equalizing, the ventilated disc keeps cool, and only an occasional tightening of the take-up nut is needed. Adjustment or lining replacement can be made by any driver, any time, in a few minutes.

That is why practically all bus and truck manufacturers include TRU-STOP Emergency Brakes as standard or optional equipment.

Demand more than a parking brake. Demand a *Real Emergency Brake*. For literature and full information, address:



When re-lining* TRU-STOP *Brakes, be sure to use only genuine* TRU-STOP *Brake lining. It is a special lining developed for use with* TRU-STOP *Brakes. Ordinary wheel brake lining will not give adequate service.

AMERICAN CABLE COMPANY, *Inc.*

Automotive Division

BRIDGEPORT, CONNECTICUT

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ACCO—*the first four letters in accomplishment—are part of the trademark of the American Chain Company, Inc., with which we are proud to be associated.*

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TRU-STOP

A REAL EMERGENCY BRAKE

Say "I saw it in FLEET OWNER"—It Helps!

QUESTION *of the* MONTH

"By far, one of the most valuable departments to be found in any automotive publication. Every fleet man should be delighted to cooperate."—A Reader

Here Are a Few Representative Answers to Question No. 22:

Bus Fleet's Brake Experience

"ALL of our brake relining work is done in our own shop. On internal brakes we used moulded and woven lining; on external we use woven only. We find that ——— woven lining can be used successfully on all types of brakes, both internal and external.

"A combination of Hunt-Spiller drums and Anchorite lining gives us best results, although we use Anchorite woven on Yellow Coaches (internal), American Brake Blocks on A. C. F. Coaches with Westinghouse air brakes, and Anchorite on all other external hydraulic brake applications. We use both Hunt-Spiller drums, and Gunite drums.

"All brake lining is purchased from a jobber. We prefer American Brake Blocks and Anchorite woven lining, and use about 100 feet per month. Average mileage per brake reline is about 12,000 in heavy service. Average drum mileage is about 150,000 miles."—*Stanley J. Macior, Foreman, Metropolitan Motor Coach Co., Oak Park, Ill., operating a fleet of 20 buses, one truck and three passenger cars.*

A Coal Fleet Operator's Story

"BRAKE relining work is all done in our own shop, with the exception of drum truing, which is farmed out. On internal brakes we use woven and moulded lining; on external we use woven only.

"We have not found a brake lining that can be successfully used on all types of brakes. Our average brake lining mileage is between 5,000 and 10,000 miles. A set of drums lasts about 80,000 miles.

"Brake lining is specified by make when ordered. We use about 50 feet per month, which we get from a jobber."—*Fred Copp, Pacific Coast Coal Co., Seattle, Wash., operating a fleet of 80 trucks and 20 passenger cars.*

How a Milk Dealer Does It

"MOULDED brake lining is used on all internal jobs; woven on the external. We do all of our own brake lining work, except drum truing, which is farmed out to an outside shop. We have not as yet found a lining that can be successfully used on all types of brakes.

"Our fleet is so varied as to type of equipment and nature of country, also operating conditions, that it is next to impossible to figure out any mileage of brake lining and drums. For replacement we use factory brake drums and brake lining which we specify when ordering from our jobber. We prefer American Brake Blocks and Raybestos Velcoe lining."—*J. E. Kreis, Garage Supt., Walker Hill Dairy, Washington, D. C., operating a fleet of 40 trucks and 5 passenger cars.*

A Bakery Speaks Up

"BRAKE drum truing is farmed out; otherwise we do all of our own brake work in our own shop. We use woven and moulded lining on internal brakes and woven on external brakes.

"We have not found any brake lining that works well on all types of brakes. We are trying various kinds just now. Average brake lining mileage is about 20,000 miles. Brake drums seem to last the life of the vehicle and we have very little trouble with them.

"We use about 50 feet of brake lining per month and specify it by make when ordering it from our jobber. Drums we get from the truck maker, when necessary.

"At present we are trying out different kinds of types of brake lining and are now using an "LX" lining that is giving good results. We have never experienced much drum trouble except where the driver was at fault."—*L. J. Dippold, Durkee's Domestic Bakery, Homer, N. Y., operating a fleet of 12 trucks and 3 passenger cars.*

All Kinds of Cars in This Fleet

"WE do all our own brake work right in our own shop, including relining and brake drum truing. We use block lining on internal brakes and woven lining on external brakes, but have not yet found a lining that can be used successfully on all types of brakes.

"American Brake Blocks give best results with cast iron brake drums. Thermoid lining gives best results with pressed steel drums; in fact we prefer American Brake Blocks for internal brakes and Thermoid H. C. for external brakes. Our preference in brake drums is Gunite. Brake lining is specified by make, when ordering from our dealer, about 50 feet monthly.

"Brake lining mileages are as follows: 5,000 woven; 28,000 Brake Blocks. The brake drums give about 150,000 miles plus. Some are still in service after this mileage."—*Austin Riley, Master Mechanic, Logan Valley Bus Co., Altoona, Pa., operating a fleet of 9 trucks, 21 buses and 67 passenger cars.*

More Bus Brake Data

"IN our own shop we do all brake relining work. Drum truing is all farmed out to specialists. We use block type lining on internal brakes and woven and moulded on external brakes. We have not as yet found a lining that can be universally used successfully on all types of brakes.

"Brake lining is ordered from our Jobber and we specify it by make when ordering. We prefer Ebonite and American Brake Blocks and Hunt-Spiller drums."—*K. W. Conner, Supt. Equipment, Jamestown Motor Bus. & Transportation Co., 560 W. 3rd St., Jamestown, N. Y., operating a fleet of 6 trucks, 22 buses, 1 trailer and 4 passenger cars.*

QUESTION - *of* - *the* - MONTH CLUB (*Continued*)

Brakes for 147 Buses

"ALL of our brake work is done in our own shop. We only have internal brakes and use moulded and block type lining. Our best combination is with block lining and gun iron drums.

"Average brake lining life is 25,000 miles; average drum life is about 100,000 miles. We prefer brake blocks made by American Brake Block Company and Anchorite blocks. Brake drums from the White Company and Hunt Spiller are our choice.

"Our source of supply is from manufacturer and jobber and we specify brake lining and drums by make when ordering."—*C. A. Martin, Supt. of Maintenance, White Star Lines, Washington, Pa., operating a fleet of* 147 *buses and* 5 *passenger cars.*

From a Tennessee Power Company

"WE use all three types of brake lining (woven, moulded and block) on internal brakes; and woven only on external brakes. All our brake work, with the exception of drum truing, is done in our own shop. We have not as yet found a brake lining that can be used satisfactorily on all types of braking systems.

"We have no data available as to combination of drums and lining and no record is kept as to life or mileage of lining and drums. Our total consumption of brake lining varies from month to month.

"Manufacturers' specifications are usually followed when relining brakes. We prefer gun iron drums. Brake lining is purchased through jobbers and we specify it by make when ordering.

"We do not keep an accurate mileage test on brake lining and drums on account of having various types of equipment. We find that the best results are obtained by using the make of lining specified by the car manufacturer."—*H. G. Young, Supt. Garage, Tennessee Electric Power Company, Chattanooga, Tenn., operating a fleet of* 36 *trucks,* 23 *buses,* 4 *trailers,* 52 *passenger cars and* 3 *other vehicles.*

A Laundry Airs Its Data

"MOULDED lining is used on internal brakes and woven on external brakes of the vehicles in our fleet. We do our own brake relining work but farm out drum truing. We have not as yet found a lining that can be successfully used on all types of drums.

"We find that brake lining life is about 12,000 miles and drums last about 20,000 miles. We use about 26 feet of lining per month, preferring Rusco lining and Thompson drums. We order from our Jobber and specify brake lining and drums by make when so doing.

"We note a particular saving in keeping our brakes properly equalized and keeping the drums trued. We also keep such parts as cables, clevises, shafts and wheel bearings well lubricated."—*R. H. Fassett, Garage Supt., El Paso Laundry, Inc., El Paso, Tex., operating a fleet of* 24 *trucks and* 6 *passenger cars.*

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York City)

Question No. 24—Governors

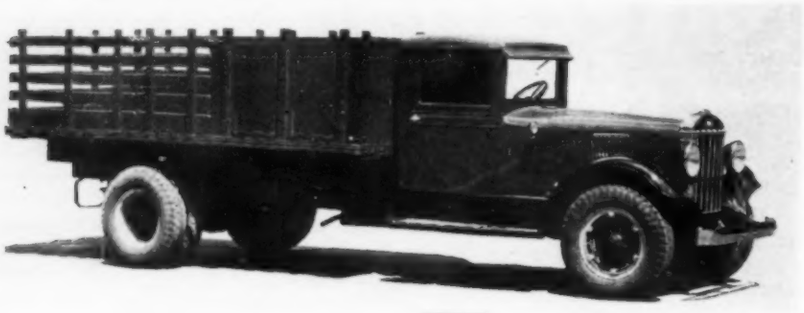
What percentage or portion of your fleet is equipped with Governors?.....
Do your drivers object to Governors on their vehicles?.....
What are the benefits derived from Governors?.....
.....
What are the disadvantages? (If any).....
.....
What make or type of Governors are you using? (See below)
Centrifugal? ..... Gas Velocity? ..... Vacuum? ..... Electro Vac? .....
What make or type do you prefer?.....
At what maximum speed are your Governors set?.....
Are your Governors sealed and inspected regularly?.....
If you have used Governors, please let us know whether or not any reductions in the following costs have been noted, and approximately how much. (See below)
Operation and Maintenance Costs..... Lubrication Costs .....
Engine Repair Costs ..... Fuel Consumption Costs.....
Tire Maintenance Costs..... Brake Maintenance Costs.....
Do Governors increase the life of your vehicles?.....
Special Remarks .....
.....
.....
If you are interested in receiving free literature on Governors, please check.....
How many vehicles in your fleet?
.....Trucks; .....Busses; .....Trailers; .....Pass. Cars; .....Others.

Note: If you cooperate with us and fill out this questionnaire, you will be entitled to a tabulated report covering all of the answers.

Swap your Governor experience with other fleet operators in this easy, convenient way. We do the work. You get the benefit.

Name of Firm .....
Address .....
City and State .....
Your name .....*Position*.....

2 AND 4-TONNERS REO'S NEWEST



CONTINUING the policy of improvement and enlargement of their truck line begun a year ago, Reo Motor Car Company announces a new 6-cylinder Gold Crown Engine Two-Tonner at $1,095, and a new 8-cylinder Gold Crown Engine Four-Ton Truck at $2,995. A complete line of Reo-built cabs and bodies, covering every need, both standard and special, and Tractor-Trailer units ranging up to 32,000 lbs. gross are supplied with these new chasses.

While the conventional rating is employed for purposes of classification, the trucks will be marketed under the new Reo Ability Rating plan, which tells the buyer specifically what he may expect of a truck under any given conditions. The new 2-Tonner, for example, is rated "11,000-4¼-47," which means that it will haul a gross load of 11,000 lbs. over a 4¼ per cent grade in direct drive, and will travel over average hard-bottom level roads at 47 miles an hour at only 2,800 R. P. M.

The Ability Rating of the 4-Tonner is "20,000-3¼-43." In each case, Reo officials say the rating is figured on a conservative basis. Under this system, officials point out, the operator knows the facts and can escape the abuse and depreciation that comes from overloading and overdriving trucks on the basis of a claim or a mere guess as to the vehicle's ability to stand the strain.

Both models are equipped with Reo Gold Crown engines. The 2-tonner engine has a 268 cu. in. piston displacement; that of the 4-tonner is 358 cu. in. The entry of Reo into the eight-cylinder truck field is in line with the recent development in commercial transportation which calls for higher power and road speed.

Features of the new eight-cylinder engine, as pointed out by the makers, include: oil filter, oil cooler, chrome-nickel alloy cylinder block, Lo-ex aluminum alloy pistons, nine-bearing counterbalanced crankshaft, Electro-vac governor and unusual accessibility of all parts. It develops 110 h. p. at 2,800 r. p. m. and 230 ft.-lbs. of torque. Maximum torque is reached at between 1,600 and 2,100 r. p. m.

The 4-speed transmission of the 4-tonner is a Reo-built job and has gears of nickel-molybdenum steel. Steering system is the Ross cam-and-lever type and the brakes are 4-wheel, internal-expanding hydraulics. A special feature is the vacuum brake booster. Front tires and rears are the same size, making it unnecessary to carry two sizes of spares. A full-floating, roller bearing, rear axle is used.

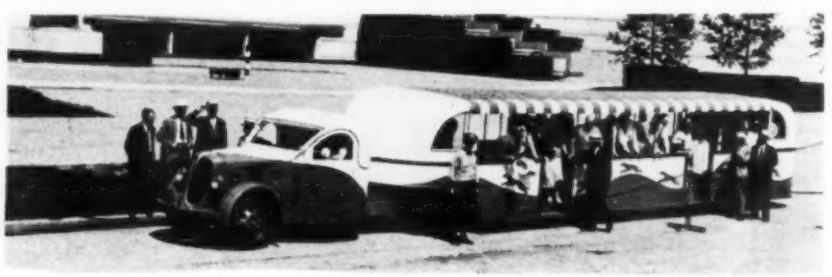
The 4-Tonner will be supplied in wide varied wheelbases, starting in with 150 in. wheelbase. The frame is particularly husky, 34 in. wide in full conformity with S. A. E. standards, 10 in. x 3 in. x ¼ in. thick, and built of S. A. E. 1,025 material. It is pointed out that the frame not only is built to look massive, but actually constructed to withstand unusual strain. There are seven heavy cross members. A Myers magazine type oiler is standard equipment.

Reo is also adding to its line a special 4-ton truck with 5-speed Reo-built transmission, double reduction axle, full air brakes, and

(*Please turn to page 46*)

WORLD'S FAIR BUSES OPERATING

MODERNISTIC blue and silver semi-trailer type buses are now carrying visitors to see the sights on the grounds of Chicago's 1933 World's Fair—A Century of Progress Exposition. Two of these buses were put into operation recently by the Greyhound Corporation. Eventually there will be a fleet of sixty of these unique buses comprising the World's Fair intra-fair transportation system.



The buses are of unique design and were built especially for A Century of Progress service by the General Motors Truck Company, Pontiac, Mich. They are forty-five feet long and contain two longitudinal seats arranged back to back so that all ninety passengers face outward. They are open with a roof overhead and curtains for use in inclement weather.

At present the buses travel from the north entrance at Twelfth Place to Thirty-fifth Street and back, stopping at Fair buildings already standing and approaching completion, amusement attractions and interesting historical repreductions. The bus pictured in the accompanying illustration is shown in the great courtyard of the Hall of Science.

It has been called to our attention that the paneling used on these buses is made of "Plymetl", according to officials of the Haskelite Manufacturing Corporation, 120 S. La Salle St., Chicago, Ill., which firm will be pleased to send additional details on request.

APPROVED

ONLY AFTER RIGID TESTS

Minnesota State Highway Dept. Truck equipped with Donaldson Air-Cleaner.

At least 75% of all motor overhauls, cylinder reboring, piston and ring replacement are due to road dust.

Donaldson Air-Cleaners will eliminate overhauls, maintain low oil and gas consumption, reduce carbon formation, promote general all-round efficiency of your vehicles.. Equip with

DONALDSON
OIL-WASHED-AIR-CLEANERS

Minnesota State Highway vehicles often operate under extremely bad dust conditions. Overhauls and replacements, due to road-dust, were frequent and expensive. Ordinary filters were ineffective.

Highway Department officials decided to do something about it. Exhaustive tests were conducted covering various types of air cleaners. DONALDSON OIL-WASHED-AIR CLEANERS were approved and installed on motorized equipment. Their air-cleaning problem is solved. Here are a few other concerns now using DONALDSON AIR-CLEANERS:

E. O. Dahlquist Construction Co., Minneapolis
Pure Oil Co., Chicago, Illinois
Lundeen Bros., Mankato, Minnesota
Sinclair Prairie Oil Co., Tulsa, Okla.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Harley-Davidson Mfg. Co., Milwaukee, Wis.
Amplex Mfg. Co. (Division Chrysler Corp.) Detroit, Mich.

SEND FOR FULL INFORMATION

DONALDSON CO.,
Pelham & Wabash, St. Paul, Minn.
Send us full information regarding your Oil-Washed-Air-Cleaners.
Name .....
Company .....
Address .....
.....
(List make, year and model of vehicles.)

"Ability Rating" Announced by Reo

A NEW system of rating its Speed Wagons and trucks is announced by Reo Motor Car Company, Lansing, Mich. The system is intended to eliminate all guess-work as to a truck's ability to haul a given load under given conditions and to enable operators to select their equipment with assurance that it will do the job.

"Ability Rating" is the term chosen by Reo for the new rating plan. Instead of being designated simply as a 1½ ton truck, for example, the Reo vehicle will bear a plate on which will be inscribed: "8500-4½-51".

The "8500", it is explained by Reo, means the weight of the chassis plus body allowance, plus amount of payload beyond which the abuse stage approaches; in other words, the maximum load consistent with long life and economical performance.

The "4½" indicates the grade it will climb with such a load in high gear, with standard tire sizes and standard gear ratio.

The "51" denotes the speed at which the truck will travel, loaded, on the average level road, also with standard tires and gear ratio.

Special plates are provided for special equipment. In other words, every truck, regardless of its size or purpose, will carry a plate telling the owner precisely what to expect of it. Even if tire sizes or gear ratios are changed by a dealer, after the truck has left the factory, similar provisions are made to protect the owner. A specially devised slide rule gauge gives the dealer the information at a glance and he inscribes the proper figures on the plate.

Prominent truck operators who were consulted before the "Ability Rating" plan was adopted, herald it as a most progressive step in capacity rating, Reo engineers report.

Carl Parker, head of the Reo Truck Sales Division, who is credited with originating the "Ability Rating" Plan, declares that Reo has not asked for copyrights on it.

Experience With Gas-Electric Buses

A REDUCTION of 13.6 per cent in the number of accidents, a reduction of 49.9 per cent in the cost of them, and an increase of 16.8 per cent in the number of bus-miles per accident is the record achieved by the Baltimore Coach Company, which two years ago replaced 14 mechanical-drive double-deck (two-man) buses on the Charles Street route with 12 General Electric equipped gas-electric buses.

The safety record was brought out by an analysis of data representing the first year of gas-electric operation and the last year of mechanical-drive operation. The new double-deck buses, with one-man operation, covered one per cent more mileage and carried 6.5 per cent more passengers. At least part of the improved safety record, according to General Electric engineers, is because electric drive gave the operator complete freedom from gear shifting.

Another advantage of gas-electric drive has been brought out by the buses of the Public Service Coordinated Transport of Newark, N. J., which operates approximately 1400, 33-passenger, gas-electric buses. In less than six years every one of the first 395 buses has been operated at least 250,000 miles in city service, and some already have passed the 300,0000-mile mark. No factor has developed to limit their indefinite continuance in service, according to the General Electric Company's engineers.

AN ALUMINUM, REFRIGERATED TRAILER

THE history of fast, economical transportation has been a continual development of lighter equipment. And, in the shipment of perishables, this has been paralleled by the development of more efficient portable refrigerating systems. As a result, perishables can now be shipped for long distances by truck; new markets are opened to the producer; and the goods reach the customer in better condition.

This progress in high speed refrigerated transportation is reflected in the advanced features of the new transport bodies designed by the engineers of the Davidson Transfer & Storage Company, in collaboration with those of Fitz Gibbon & Crisp, Inc., the builders.

An all-aluminum framework provides greater strength than steel and wood at a very worth while saving in weight; and polished aluminum paneling further contributes to light weight, while at the same time providing an attractive, noticeable exterior which also serves to reflect heat.

Refrigeration is by solid carbon-dioxide (Dry-Ice), used with the Icefin conduction system, which is capable of maintaining any desired temperature above 0° F.

Overhead plates, flush with the inside of the roof, pick up heat from the inside of the body, feeding it to the "Dry-Ice" stored in roof hatches. With this system there are no fins or bunkers to occupy space within the body, and as the roof hatches are reached from the outside they can be charged with "Dry-Ice" when the body is fully loaded.

As air circulation is necessary for proper cooling, floor racks are provided for use with solid loads. When not in use, these racks can be folded and stored in water-tight compartments built into the side skirting of the body.

In addition to serving as dual purpose bodies, for use with either ordinary freight or refrigerated loads at any temperature, these bodies are fitted with a movable insulated partition to shut off part of the body from refrigeration and so permit economical shipment of *partially* refrigerated loads, a feature that is exceedingly useful.

Every known feature for convenience and sanitation has been included. Cleanliness is easily attained, as the waterproof, all-aluminum welded floor can be flushed out after every trip.

These units are now in daily service transporting perishables over long distances and manned by operators trained to understand and handle critical loading and proper temperatures.

Performance in service has been gratifying and the owners feel that truck transportation of perishables is now entering a wider field with insured long distance cargoes, well beyond the experimental stage.

NEW ALL-WHEEL-DRIVE TRUCKS

A COMPLETE new line of all-wheel drive motor trucks, consisting of twelve models ranging from two to fifteen tons in capacity, is announced by the Marmon-Herrington Company, Inc., of Indianapolis.

This new line supplants the former offering of five models. Seven new models have been added, while the additional five have been improved and refined. Prices range from $3,785 to $17,500, f. o. b. factory, the lowest priced truck being the model TL-27-4 with a capacity of two to two and one-half tons, and the highest priced the model TH-330-6, a six-wheel-drive unit with a capacity of twelve to fifteen tons.

Since their introduction more than a year ago, Marmon-Herrington trucks have served in the transportation field by combining the advantages of both truck and tractor. The new line is engineered to do difficult, heavy jobs and at the same time perform with speed on the highway. A. W. Herrington, formerly consultant of the U. S. Army, and now president of the company, is the designer of the new line.

Outstanding features of the new line include the patented front axle and front steering arrangement design, the equipping of all trucks with both standard and auxiliary transmissions giving as many as twelve speeds forward and four reverse, the application of power giving the advantages of all-wheel drive traction, and ease of handling and control. (*Cont. on page 46*)

To Save Trailers from Scrap-Heap

A COMPREHENSIVE educational program to enlighten car equipment distributors, fleet owners, truck operators and service station managers on how to save approximately 40,000 brakeless trailers from being legislated off the highways this year is being conducted by The Timken-Detroit Axle Company in conjunction with four subsidiaries of the Bendix Aviation Corporation. These concerns are the Bendix Brake Company, Bragg-Kliesrath Corporation, Hydraulic Brake Company, and the Bendix-Westinghouse Automotive Air Brake Company.

Meetings already have been held in New York, Chicago, Cleveland, and Memphis, at which full details of a newly developed brake-mounted trailer axle for brakeless trailers were presented to large gatherings of automotive trade representatives vitally interested in the solution of the acute problem confronting trailer operators.

Similar meetings will be held in other automotive trade centers throughout this country and Canada. L. W. Fischer, advertising manager of The Timken-Detroit Axle Company, is in charge of the program.

"To convert brakeless trailers into transport units that will meet every legal requirement is strictly an engineering problem," Mr. Fischer said. "Attempts to put brakes on present axles invariably result in cobbled-up jobs. The axle must be designed to withstand braking torque and to take any type of brake and power application equipment desired. To prevent thousands of brakeless trailers which are in good condition, except that they have no brakes, from being scrapped by state laws, a trailer axle recently has been developed by Timken which is being equipped with any desired type of Bendix, Hydraulic or Timken brake. Power application can be either by B-K vacuum brake boosters or by Bendix-Westinghouse air brakes and controls. By substituting this new unit for the brakeless axle with which the trailer was originally equipped, the vehicle can be operated in any state."

(Editor's Note: Fleet operators interested in getting data on the proper application of modern brakes to brakeless trailers, are invited to get into touch with the Editor of this publication.)

"Black Light" for Instrument Panels?

USE of ultra-violet rays to make visible at night the instrument panels of automobiles is foreseen as a possible result of development work being done with the ray by Westinghouse Electric & Manufacturing Company. Although these rays are invisible, they increase the natural fluorescence of radium dial markings so that instruments coated with radium are clearly visible at night. Extensive experiments have already been carried out by Westinghouse on airplane instrument panels.

Regarding automotive applications, J. H. Kurlander of Westinghouse says: "Artificial light on automobile dashboards has always been more or less of an objection in night driving. The glow of light in the driver's seat often produces reflections in the windshield and interferes with a clear view of the road ahead. The ideal situation, or that allowing greatest contrast between the view of the road and the interior of the car, has no light whatsoever for the instument board.

"The use of ultra-violet radiations in this manner is perhaps of more immediate value on buses and trucks which do a majority of night driving. To have the interior completely dark would be in keeping with the present practice of bus drivers cruising at night, but more important, the instruments could still be read conveniently and quickly."

QUALITY GASKETS
Quickly Available

A tough, yet compressible gasket—Vellumoid makes tight connections which ***stay tight.***

Cut or tap out Vellumoid gaskets from the sheet as you need them. No trouble, no waiting—and you have at once and ready for use any Oil, Gasoline, or Water gasket required—not one missing, and each of the highest quality.

For the cars, trucks or busses in your fleet, keep on hand a supply of Vellumoid ready-cut gaskets. They do not stretch nor shrink, and are always ready for use.

Ask Your Jobber

VELLUMOID
THE REAL REPLACEMENT GASKET MATERIAL

The Vellumoid Co., Worcester, Mass.

You Save Money

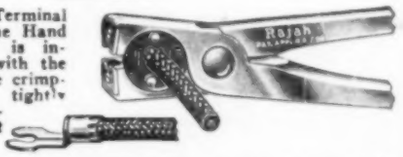
on rewiring jobs by using the new **Rajah** Hand Crimping **Tool**

This new tool crimps Rajah Terminals to ignition cable without the use of solder or any other tool. Note the simplicity of using it.

(Right) The cutter on end of Tool will remove just enough insulation.

(Left) Bend the exposed wire strands over end of Cable, then insert into ferrule of Terminal.

(Right) Now crimp Terminal to Cable by using the Hand Tool—The Terminal is inserted in the Tool with the ferrule flush with the crimping jaws—Compress tightly and you have a positive and permanent connection.



Tool with neat metal box containing 250 distributor terminals and 253 assorted spark plug terminals, $11.20. Tool alone $4.00.

THE RAJAH COMPANY, Bloomfield, N. J.

Send this coupon with your letterhead or business card for our special offer. You are sure to receive an unusual present. No obligation.

Name .....

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☐ Proprietor ☐ Service Manager ☐ Shop Foreman ☐ Mechanic

New! Revolutionary Tool

at 1/10 ordinary cost

Showing pair of H. T. S.'s in action.

Every fleetowner needs equipment for proper inspection and repairs on heavy duty tires. This new hand device (sold in pairs) offers it at an unbelievably low cost. Also invaluable as auxiliary equipment in large service shops. Write today for descriptive folder.

THE WADSWORTH CORE MACHINE & EQUIPMENT CO.
67 So. College St. Akron, Ohio

THE WADSWORTH HEAVY DUTY
Hand Tire Spreader

Truck-Bus Taxes in 1931

TAXES paid by trucks and buses in 1931 totaled $293,000,000—or more than 28½ percent of the collections from all motor vehicles in the United States, the National Automobile Chamber of Commerce reports in its yearbook, *Facts and Figures of the Automobile Industry*. These commercial vehicles represented less than 13½ percent of all vehicles in operation.

Gasoline taxes accounted for the biggest portion of the truck payments to state and local governments, amounting to approximately $144,530,000. Registration fees for trucks approximated $77,000,000 and the gas taxes and license fees paid on buses were $31,775,000.

In addition, personal property assessments on rolling stock and special municipal taxes claimed $40,000,000 of the commercial vehicle operators' income.

HOTEL LENOX

New Lower Rates in Keeping with the Times

Single $2 to $3.50; Double $3 to $6; Family Suites $6 up.
Three minutes from Peace Bridge to Canada. 20 miles to Niagara Falls.
FREE. Excellent AAA road map and booklet. Write

CLARENCE A. MINER, President
140 North St. near Delaware

BUFFALO, N. Y.

ARMORPLY

A SUPERIOR METAL FACED PLYWOOD PANEL FOR BODY CONSTRUCTION

Write for samples and prices

UNITED STATES PLYWOOD CO. INC.
603 W. 36th. ST. NEW YORK CITY

Trends in the Taxi Industry

THE trend during the past five years in most of the large cities of the United States has been to limit the number of automobiles, taxicabs and buses on the streets of the cities. Through local or state regulation many cities have reduced the number of taxicabs permitted to operate and have prevented additional taxicabs from being placed on the streets without permission from a board of control. Public convenience and necessity has to be shown as a pre-requisite to securing a license. Most notable in this restriction has been the recent inauguration of the Board of Control in New York City where, through friendly cooperative measures, the number of taxicabs operated on the street during the past summer has been reduced almost five thousand in number.

In cities where limitation has not been practised, such as Baltimore and Washington, the competition of jitneys and taxicabs has made serious inroads into the revenues of the street railway companies. Recently, the City Council in Chicago repealed the limitation ordinance which has restricted the number of taxicabs in Chicago during the past three years. But, following protests made by the street railway employees, who feared a disastrous competitive condition, the City Council rescinded its repeal, thus continuing the limitation and barring the gates to all cut rate or jitney form of taxicab service.

In cities where a highly competitive condition has developed in the taxicab business, there has been marked deterioration in the quality of the equipment and in the working conditions of the cab drivers, inaugurating a form of patronage. This results in impoverished earning power for the cab driver who is forced to work humanly-unbearable long hours. This is regarded as dangerous to the public welfare, because when the cab drivers speed it up under such conditions to deliver the occasional passenger and then cruise for another, it is at the risk of life and limb for the cab rider and the pedestrian on the streets.

Form Texas Motor Transportation Assn.

FACED with rapidly accumulating proposals to increase motor truck taxes and restrictive regulations, truck owners of all classes in Texas have united with dealers in automotive equipment, accessories, and supplies to form the Texas Motor Transportation Association with headquarters in the State capital, Austin.

The new organization supersedes the Texas Truck Owners Service Bureau, an organization composed largely of operators for hire and large fleet owners, and includes within its membership all owners of trucks, regardless of weight, size or scope of operation.

Bakers, dairies, bottlers, grocers, hardware houses, wholesalers and other commercial firms using trucks in their business; operators for hire both intercity and intracity; and dealers in trucks, tires, batteries, oil gasoline, grease, and other equipment, supplies, and accessories, as well as employees of all the foregoing classifications are eligible for membership in the Association, which promises to be the largest trade organization in the State by the first of the year.

Literature of the Association describes it as "An organization fostering the proper use of the streets and highways of Texas."

"Proper" is interpreted to mean the use most beneficial to the public and calculated to give the public the greatest return on its huge investment in streets and highways—a return that can not be realized if they are restricted to private passenger cars.

Under this interpretation, according to Tom Jones, president of the Association, undue taxation and undue

regulation of motor transportation is an injustice to the public as well as to the owner and operator and will be attacked on the basis that the public is entitled to the cheapest and best transportation service that can be provided, regardless of the kind of transportation agency used.

An active legislative program to repeal or modify existing statutes that are designed for the protection or benefit of competing forms of transportation rather than for the benefit of the public and which destroy or hamper the fullest usefulness of motor transportation will be carried on by the Association.

Free Wheel and Brake Instruction

BEGINNING November 1, and continuing throughout the winter months, Bendix Brake Company will operate a service school at its South Bend factory, specializing particularly in wheel alignment and all forms of brake service. The course of instruction is absolutely free to all service men, but students are expected to pay their own travel and living expenses. The sole qualification is that those applying for registration have previous service experience in one subject or the other.

Bendix' decision to operate such a school was prompted, officials say, by the widespread demand among mechanics all over the country for expert instruction along these lines. The two courses will be conducted simultaneously, each requiring approximately two weeks for completion. Service students wishing to avail themselves of this opportunity are requested to file their applications with Mr. M. M. Cunningham, assistant service manager, Bendix Brake Company, 401 Bendix Drive, South Bend, Indiana.

No Depression in Davenport

THERE seems to be no depression so far as the Geo. L. Hunt Automotive Equipment Company, of Davenport, Iowa is concerned.

This concern recently moved into an immense new plant just north of Davenport, with greatly expanded facilities for the manufacture of BEE-LINE wheel, axle, and frame straightening and aligning equipment. With June sales the highest in BEE-LINE history, and business increasing daily, this change was essential and timely.

The new plant exceeds by many thousand square feet, the building just vacated, and is equipped with overhead traveling cranes, modern machinery and complete manufacturing and shipping facilities.

There is a direct railroad connection the length of the plant, with a spur running into the factory itself. Additional office space, made necessary by the increase in business, is provided.

An increased production schedule is planned for the balance of the year as BEE-LINE equipment is being well received by fleet owners, company officials announced recently.

Bus Operators to Convene at Chicago

FINAL dates for the conventions of the American Electric Railway Association and the National Association of Motor Bus Operators are as follows:

The A. E. R. A., and affiliated associations, will hold its annual convention in Chicago, September 27th and 28th. Headquarters will be at the Stevens Hotel.

The N. A. M. B. O. will hold its convention in the same city on September 29th and 30th, according to latest announcements. Operators having membership in both organizations may thus participate in both conventions without inconvenience.

An Indispensable Gauge Set for Fleet Owner Shops

Bee Line Toe-In Gauge

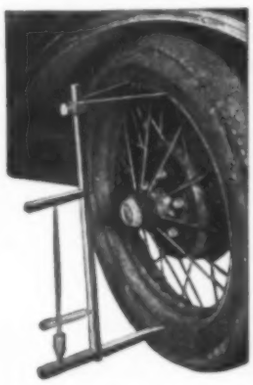
The most efficient gauge on the market. Results are absolutely accurate. Corrects wear on tires and difficult steering. No mechanical parts to get out of order easily. Free from intricate spring mechanisms. Simple to read and operate.

Price each **$15.00**

BEE-LINE Camber and Axle Casting Gauge

No automobile or truck will steer properly if the tilt or caster of tires is incorrect. Most cases of "shimmy" are due to this fault—easily corrected with proper equipment.

The BEE-LINE gauge for this job—together with the BEE-LINE Toe-In Gauge is an unbeatable combination. The cost is little—the savings great.



Price each **$17.50**

Geo. L. Hunt Automotive Equipment Co.

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Round as a Dollar

Means easier installation and longer wear. Bates Quality Starter Gears are made in a complete line of sizes.

BATES WOHLERT CO., Lansing, Mich.

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Eliminate Expensive Coil Cushion Repairs!

Stop this expensive practice—plug this costly leak in operating expense. Sponge-Aire cushions cost no more than coil cushions and *never need repair.*

Write for full particulars today.

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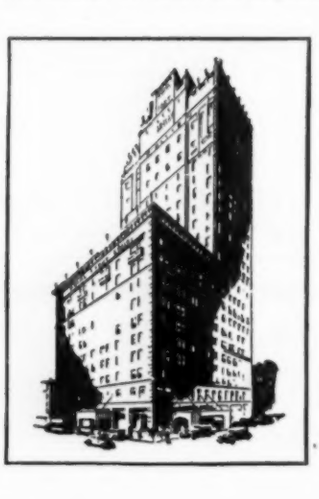
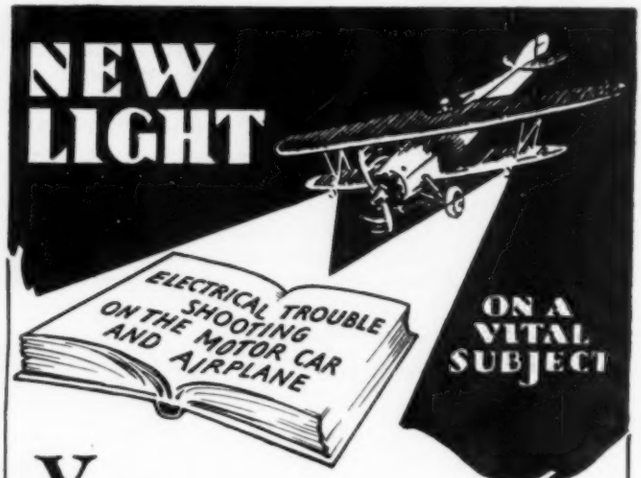
Motorists are relieved of their automobiles at the door without service charge. Write for free road map, and your copy of "Aglow with Friendliness," our unique and fascinating magazine.



HOTEL Fort Shelby
"AGLOW WITH FRIENDLINESS"
E. J. BRADWELL, Manager
DETROIT

NEW LIGHT ON A VITAL SUBJECT



You *will surely want a copy of*
"ELECTRICAL TROUBLE SHOOTING"
(on the Motor Car and Airplane)
By A. H. PACKER

A new edition is just off the press. It covers everything from wiring to armature rewinding. Takes up generators, starters, cutouts and regulators on all cars, trucks, busses and airplanes. Contains scores of test kinks that will be found handy in the shop. Explains test bench construction; takes up flat rates; in fact anything electrical in the automotive game.

Earns its cost on first job's profits. Has 47 chapters, 530 pages, 353 illustrations, over 600 questions and answers, four trouble shooting charts and a thorough index. Size 5½ x 8 inches. Flexible binding. Price $4.00. Sold on five-day trial. Money back if not satisfied.

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TROUBLE SHOOTER

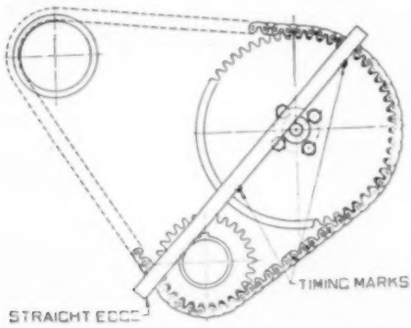
(You Ask 'Em — We Answer 'Em)

A department, devoted to correspondence from readers of FLEET OWNER. Any questions having to do with automotive service will be answered in this department. All properly signed inquiries will be replied to by mail and such of them as are believed to be of possible interest to other readers will be published in these columns.

Timing a Hupp Model M

Question: Please send me the correct valve setting on Hupp Series M, 1929. We want to know how the marks on the cam shaft sprocket coincide with those on the crank shaft sprocket.—J. B., Herrin, Ill.

Answer: The sketch which we are printing here will show how the marks on the cam sprocket should line up with a straight-edge resting on the crankshaft, keyway on top, and camshaft thrust plunger.



With the keyway on the crankshaft in a vertical position on top of the shaft, lay a straight-edge over the crankshaft and thrust pin in camshaft. The two X marks on camshaft sprocket should line up with straight-edge as shown. When these marks line up, the flywheel marking "1-8 DC" should line up with the timing hole center.

Pulls to the Right

Question: One of our cars had a shimmy, a wander and on rough roads there was no feeling of control of the machine. The tire pressure was right, the spindle nuts were properly adjusted, the steering adjustment was as tight as possible without binding, and after reading your recent article on this subject, we took it to a "wheel and axle specialist."

They said that the axle tilt was wrong and recommended a set of shims under the axle. When the car came back it had a very decided pull to the right, but the "specialists" claimed that it was o. k.

Two new tires were then put on the front wheels and now, after 3,000 miles, the left tire shows decided wear on the outside half of the tread. Tire pressure has been maintained correctly. What would you suggest that we do now?—M. E. Y., Washington, D. C.

Answer: Although it is difficult to diagnose troubles from long distance, we are going to give you the following advice, which has been passed on to us by another "specialist." However, we believe that this one knows his stuff.

Your first "specialist" showed you the advisability of correcting the axle tilt and getting the wheels lined up properly. Yours was undoubtedly a case of low speed shimmy and this was the proper procedure. The fact that he overcame the shimmy shows that he was on the right track.

Where he fell down, however, is that he did not complete his check-up. The causes of pulling to the right are as follows: In inserting the shim under the axle, he may have allowed the axle to slip back on one side. This would cause the car to pull to the right as it would have a tendency towards running in a circle. The mechanic may not have used the proper size shim on each side, allowing more tilt on one side than the other, so that the axle would still have a tendency to pull to the one side. It will always pull to the side which has the greater tilt, providing other conditions are correct.

It is also possible that he *did* align the front end completely, but overlooked the fact that the rear wheels must track properly with the front. If he did not check the tracking and make the necessary corrections, should there have been a misalignment of the rear wheels, this difficulty would of course show up only after the front end was perfected.

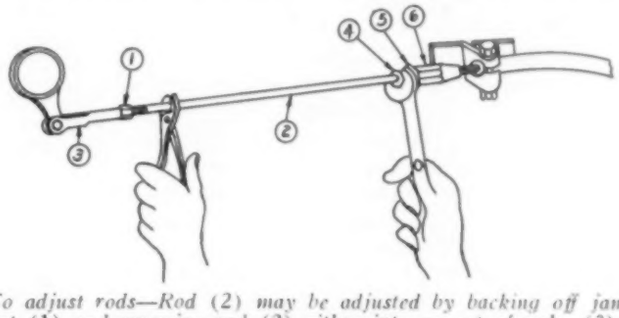
While the car shimmied or was difficult to drive, you probably could not notice the pull to the right, so it may have been that the car did this prior to your having the front end adjusted. These are the conditions for which the mechanic checking the car should look. As stated previously, a complete alignment checkup should be made. Merely guessing as to what may be wrong is poor practice.

Adjusting Steeldraulic Brake Rods

Question: We have some cars with Steeldraulic brakes and it seems that some mechanic has been fooling around with the brake rods so that we can't get a good brake adjustment no matter how we fuss with the shoes. Can you give us instructions as to how to set the rods back to where they should be?—G. L., Cleveland, Ohio.

Answer: To adjust the rods first jack up all four wheels. Then block the foot brake pedal back in the completely released position. Loosen the jam nut at the clevis end of the brake rod as well as the jam and retainer nut at the opposite end of the rod. Remember that the rod threads to the right into the clevis and swivels in the retainer nut. Now turn the rod to the right to shorten, or to the left to lengthen as is needed, until the front part of the shoe pulls away from the anchor pin from .010 to .030 of an inch. This clearance may be checked through the drum inspection hole with a feeler gauge. All four brake rods should be set alike.

We presume that you are familiar with the adjustment of the shoes, so will not go into that. The sketch accompanying this will show how the rod adjustment should be made. Under separate cover we are sending you bulletins which show how adjustments should be made on this and other types of brakes.



To adjust rods—Rod (2) may be adjusted by backing off jam nut (1) and screwing rod (2) either into or out of yoke (3); nut (4) should be held during this operation to prevent twisting the cable to which the rod is fastened. Do not disconnect any part for this operation, as rod (2) should turn freely in nut (4). If it does not, hold cable terminal (6) and back off jam nut (5); back off nut (4) one-half turn after which tighten nut (5) again.

(Editor's Note: Should other readers desire free copies of the set of brake service bulletins which we sent to Mr. L., we shall be very glad indeed to see that you get a set without cost or obligation. Just drop a line to the Editor, on your letterhead, and ask for "Brake Service Bulletins." We will do the rest and it won't cost you a cent.)

TROUBLE SHOOTERS' DEPARTMENT (*Continued*)

Questions Regarding "Doughnut" Tires

Questions: I wish to get some information in regard to the new, so-called "Jumbo" or "Doughnut" tires now being sold. I am interested in the use of this tire on the new Ford V-8.

Do these tires cause any difficulty in steering, such as shimmying or shocks to the steering wheel? Is it necessary to change the steering ratio for these tires? Is it necessary to change speedometers?

Do these tires increase gas consumption? What is the estimated mileage of these tires? If air escapes from the inner tube, does this allow the car to drop 8 or 9 inches, or is the tire so thick that this drop is not obtained? Any information will be appreciated.—E. J. L., Portland, Me.

Answer: The first thing we would advise you to do is to consult your local tire dealer, who should be equipped with factory-prepared information that will answer all of your questions. Our ideas on the subject are as follows:

It should not be necessary to make any changes in the steering gear ratio and, provided that the tires are the same in *outside* diameter, it will not be necessary to change the speedometer, either..

As to whether these tires decrease speed and pickup and increase the consumption of fuel, offhand we would say that these factors would not be noticeable, although, *theoretically* these tires might have some effects in that direction.

Generally speaking, the lower the pressure in tires becomes, the more complicated will steering difficulties become. This is an accepted fact and tire and wheel engineers seem to subscribe to it, as well. As to whether or not the car will drop when one of these new tires becomes flat, we have never seen a "flat tire" of this type but are inclined to believe that the car would drop, just as it does with an ordinary balloon.

As before stated, your local tire man who sells this type of tire should be able to give you all the information you desire on the subject.

A New Job for the Brake Tester

A LITTLE known function that the modern brake testing machine can perform is that of indicating which cylinders have weak compression.

To illustrate: After the car, truck or bus is driven on to its place on the tester, shut off the engine and shift into high gear, with the brakes free. Then start the motor on either one of the rear rollers of the tester, which will turn over the car engine and the compression of each individual cylinder will be registered on the brake gauge. Any unevenness of compression will be indicated by the movement of the dial hand on the gauge.

To determine what cylinder is registering weak compression, all that it will be necessary to do is to remove one spark plug wire. When the spark appears on that wire, follow regular firing order of the car being tested and you thereby can readily determine which is the weak cylinder.

In the event of an overhead valve motor being tested, the valve action will determine the weak cylinder. In some tests, Number 1 cylinder can be located by turning the motor over very slowly so that the markings on the flywheel can be seen, and then follow through from that point.—*Suggested by B. H. Roberts Chicago, Ill.*

Why Lean Mixture Causes Knock

Question: I would like to know the reason why a lean mixture will cause a motor to knock. I am not referring to any particular car, but to all cars in general. We all seem to know that a lean mixture makes them knock, but are in doubt as to just why.—G. M. Mitchell, S. Dak.

Answer: There are many opinions on this subject and many theories have been advanced. It would seem that because a lean mixture is a slow burning one, a mixture that is too lean will still be burning when the piston reaches bottom center. When the intake valve opens, if the mixture is still burning, it will ignite the incoming charge, causing the spitting back through the carburetor. This, of course, you are familiar with.

When the mixture is too lean, less power will be developed by the engine, as you can't get power from air alone. This makes it necessary to give it "more gas" with the throttle, which admits more air into the combustion chamber, which raises the compression and causes a knock, commonly called "spark knock" or "compression knock."

As to what causes the knock, it is contended that this results from an *extra* explosion taking place. One theory is that the spark starts the mixture to burn and the flame spreads, forcing the unburned mixture in front of it into one side of the combustion chamber or a pocket.

This unburned mixture is compressed by the burning mixture to a point causing it to explode in front of the flame. This second explosion referred to is more instantaneous than the one started by the spark, causing vibration of the cylinder wall and piston or the "compression knock."

Rear-End Hint for Chevvy

Question: In working on Chevrolet rear-end jobs, we try not to take the rear axle housing off the car. We do not have any trouble until it comes to replacing the drive-shaft assembly. There is a floating iron ring that the three screws in the housing have to bear up against. Our hard part of the job is to get this ring up against the double-row bearing, so that the screws can be inserted. What suggestions can you offer?—R. M., New York, N. Y.

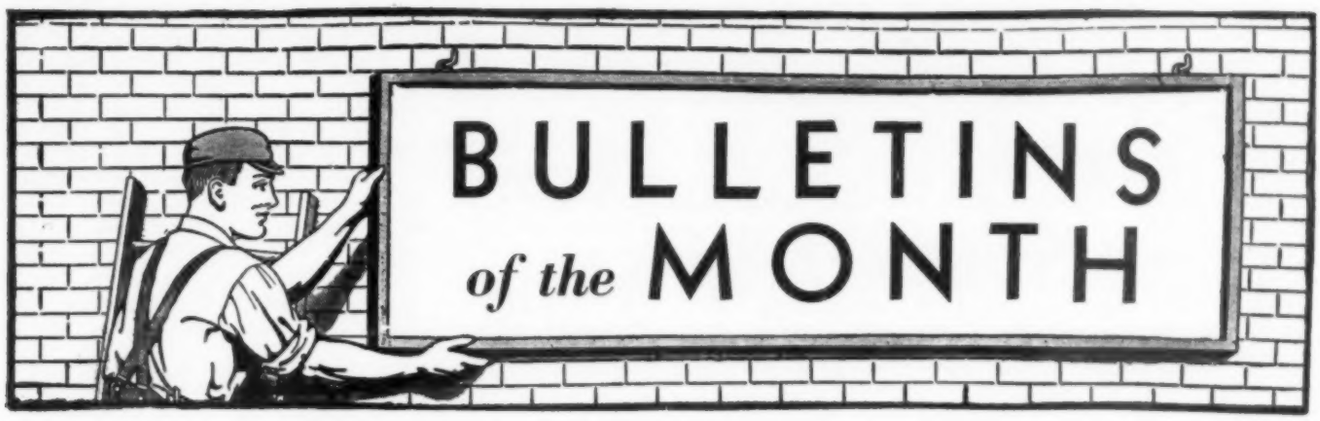
Answer: It is usually best to take off the axle, by unhooking the spring u-bolts, the brake rods and the rear spring shackles. The whole axle assembly, with drive-shaft housing, will then pull off the universal joint.

If you do this, the assembly can be held vertically, when putting the drive-shaft back, and the washer or iron ring will then fall into place.

When the axle is *not* removed from the car, some mechanics use a piece of cardboard as a spacer, folded in three parts and tied with a string, so that when assembled, the washer mentioned will not slip back.

Another easy way to do this is to put the drive-shaft assembly in place, tap the pinion bearing into the housing, and then by means of a hat-pin or knitting needle, push the floating washer up into place. The hat-pin is inserted from the back—between the balls in the rear pinion shaft bearing, and is used to push the washer towards the front of the car. (A new tool is also available for doing this trick.)

This is a two-man job, however, as one has to hold the hat-pin and poke around, while the other watches through the screw-holes and inserts the tapered screws. It is much easier, for various reasons, to take the entire assembly off.



THE six-cylinder automotive type Cummins Diesel Engine has been adopted by Indiana Motors, Robert Gotfredson Truck Company and Gramm Motors, Inc., who are about ready, we understand, to offer specially - designed, Diesel - engined trucks. The Cummins Diesel Engine Company of Columbus, Ind., also announces that several other truck makers are in a position to supply a Diesel-engined truck chassis on order.

FINANCIAL reorganization of the operating activities of Brockway Motor Truck Corporation has been recently completed and a new operating company (Brockway Motor Company, Inc.) has been formed. The new company acquires from Brockway all of its operating assets; assumes all current debts, current contingent liabilities, etc. The motor truck and service business will be continued without interruption, it is stated.

PLANS for the Joint Trade Show of the National Standard Parts Association and the Motor and Equipment Association will be carried through to completion, according to word received from N.S.P.A. headquarters. The Show will be held in Detroit early next December, as previously announced, recent discussion to the contrary notwithstanding.

THIRTY-EIGHT Cowdrey brake testers have recently been ordered by the U. S. Post Office Department, according to F. W. Parks, vice-president of Bendix-Cowdrey Brake Tester, Inc. The testers will be spotted in various cities and every mail truck will be subjected to the rigid brake tests of this machine at regular intervals, the report states.

THE truck division of Dodge Brothers announces the receipt of an order from the Indiana State Highway Department for 26 Dodge trucks to be used in maintenance work. Eleven of them are of 2-ton capacity with 136-inch wheelbase and six are of 1½-ton capacity with 131-inch wheelbase. All are equipped with dump bodies, it is stated.

MOTOR vehicle production in the United States and Canada in July amounted to 112,600 units, according to an estimate released by the National Automobile Chamber of Commerce. This was 41 per cent under the production for the preceding month and 49 per cent under that for the corresponding month a year ago.

THE details of "Automobile Lubrication," a vital matter to fleet owners everywhere, are visualized in a one-reel educational motion picture film made under the supervision of the U. S. Bureau of Mines. Department of Commerce, in cooperation with an industrial concern. Films of this picture may be obtained for exhibition purposes without charge, by writing to the above bureau at Washington, D. C.

A GAIN of 22.46 per cent in total retail domestic Speed Wagon and truck sales during the twelve months ended June 30th is reported by Reo Motor Car Company, Lansing, Mich., as compared with the previous 12-month period. Eleven of these twelve months showed gains over corresponding months of the preceding year, it is pointed out. This period represents the first full year since Reo's entry into the lowest price truck field with a 1½-tonner.

A TREND towards the liberalization of speed laws for motor vehicles in various states is shown in a survey reported in the latest issue of *Facts and Figures*, issued by the National Automobile Chamber of Commerce. Many states have no speed limits, or limits of 40, 45 and 50 miles per hour. But three states have 30 m.p.h. speed limitations.

FRIENDS of Eaton G. Edwards will be interested to learn of his connection with the Trenton Auto Rdiator Works, Trenton, N. J., in the capacity of "Equipment Sales Engineer." Mr. Edwards spent a number of years in a similar capacity with the G. & O. Mfg. Company, it is pointed out.

FOR reconditioning clutches and the correct assembly of small parts, the Long Manufacturing Company has developed a universal fixture, designed to operate without the usual necessity of the flywheel, and will take care of the entire line of Long clutches; also many Borg & Beck models. The fixture is a duplicate of standard types of flywheels and permits perfect adjustment for immediate installation.

A NEW type of ball-bearing universal joint has been developed by the New England Auto Products Corp., Pottstown, Pa. In the design of this joint it has been the aim of the engineers to eliminate the common faults of universal joints, such as excessive wear, throwing off of lubricant and inability to perform at excessive angles. Details of the new joint will be sent on request.

FURTHER plans regarding the operation of the LaFrance-Republic Sales Corporation, recently acquired by the Sterling Motor Truck Company of Milwaukee, have been announced. The sales corporation will continue to function under the same name, but with the following officials: E. M. Sternberg, president; H. C. Keenan, vice-president; W. G. Sternberg, vice-president; O. E. Held, secretary and R. W. Stork, treasurer. All operations will be transferred to Milwaukee eventually.

THE Perfect Circle Company, Hagerstown, Ind., is planning to introduce a new product to the automobile industry on or about the first of September. This product, it is said, fits very nicely with the piston ring business.

THE automotive industry has recently lost one of its most picturesque figures, with the death of Fred S. Duesenberg. He died on July 26th as a result of injuries sustained in an automobile accident at Mount Ligonier, Pa. "Fred", as he was affectionately known, had won world-wide fame as the designer of racing cars and later as builder of fine custom automobiles.

A NEW wall chart entitled "Truck Tire Failures" giving helpful suggestions to truck operators for reducing tire costs, has recently been issued by the Rubber Manufacturers' Association, Inc., New York City. The chart is illustrated with a dozen photographs which show various ways in which truck tires are abused. It should be helpful to every operator. Copies sent free for the asking.

ANNOUNCEMENT is made of the acquisition of Thorne Motor Corporation of Illinois, by the recently formed Gas-Electric Corporation of Delaware. The new Corporation will continue to manufacture the Thorne Truck, a gas-electric vehicle. It also plans to manufacture the recently developed Thorne room-cooler and air-conditioner, it is stated.

A LINE of steel-backed, copper-lead, replaceable bearings for crankshafts and connecting rods is announced by Doheny Stone Drill Company, Los Angeles, Calif., bearing the trade name "Kalif." These bearings consist of a layer of copper-lead mixture welded to a steel back by a special process, for which numerous advantages are claimed. An interesting folder describing this new product will be sent free on request.

Safety Program Cuts Fleet Costs

(*Continued from page* 16)

accident occurred. They are subject to questioning by members of the committee. With the use of miniature trucks, tractors, trailers, automobiles, railroad crossings, buildings and street intersections, it is possible to reconstruct an accurate picture.

With the representative group attending, every phase of an accident can be discussed. This aids in disclosing bad operating practices and helps suggest measures for their correction. The meeting usually last about three hours in the morning. At its conclusion, members are at leisure for the rest of the day. Since those on the committee are paid for the entire day, a desire is created on the part of all employees to serve.

Another important feature of our Accident Prevention Committee work is that the training received by members gives them an excellent background in safety work. We have found that, as a result of serving as members, employees are in a better position not only to work safely, but to see that their fellow workmen do likewise.

Weekly safety bulletins are prepared by our staff. They relate almost entirely to the hazards encountered by our employees and the accidents which have actually occurred, and are posted every Monday morning in twenty departments of the company. They are placed in specially constructed, glass-enclosed bulletin boards which are located at strategic places in each department. The bulletins used during the preceding year are bound in a convenient form and circulated among the employees. A test of the drivers' ability to recall the purposes of these former messages is made, and awards are offered.

The safety contest followed by our company is practically continuous, and is based largely on individual effort. An award of $25 is made to each operator driving for twelve consecutive months without an accident. This plan permits drivers to start over again immediately following an accident without waiting for the commencement of a subsequent contest period. Accidents are charged whenever damage to other property is involved, or when property damage to our own equipment is in excess of $5. During 1926, five operators received these awards; but in 1931, 138 were eligible by completing twelve consecutive months without an accident.

To stimulate friendly rivalry between departments for the best safety record, the number of days each department has operated without an accident, as well as the number of men employed, is posted daily.

Every encouragement is given employees to make suggestions regarding safety and other operating practices. All suggestions are acknowledged promptly, and proper credit is given when suggestions are adopted. In some cases, an award is given for the best suggestion submitted, and brief mention of these are made in the employee magazine.

The development of safety work in our organization not only has effected a direct reduction in accident expense but, through the training received, has also served to correct many operating practices of the company and our employees.

Clutch Maintenance

(*Continued from page* 24)

3. **Calipers and Micrometers**
   Necessary for making measurements and ascertaining condition of parts such as pilot bearing recess, size of clutch recess, etc.
4. **Dial Gauge**
   To be used for testing flywheel and clutch parts for roundness and wobble.
5. **Clutch Bearing Puller**
   For removing pilot bearings, throw-out bearings, etc.

There are, of course, other special hand and bench tools that fleet owners will develop from time to time, in order to facilitate clutch servicing, particularly where the unit replacement plan is followed.

However, the foregoing list of tools may be considered the absolute *minimum*, if efficient clutch maintenance is to be attained. Readers of this publication who may be interested in knowing the names of the manufacturers of any of the equipment illustrated or mentioned, may obtain same by writing to the Editor of this publication.

In succeeding issues of FLEET OWNER we are planning to continue this series of clutch articles (the first of which appeared in our August issue) and will go into detail on the instructions covering various makes and types of automotive clutches now in general use. Watch for the articles!

Self-Maintenance Vs. Farming Out

(*Continued from page* 20)

A plant, known as the "153rd St. Reconditioning Station" was established in that year, and under one roof, the reconditioning, major repairing and painting of the transportation equipment of this Company and its affiliated gas and electric companies is done.

To quote from Mr. Middleworth's previous article:

"It is not to be understood, however, that all of this work is done by us independently. We have learned that the volume of work in certain specific operations would not justify the installation, maintenance and operation of expensive machinery and equipment necessary to do this work. Consequently, such work as chromium nickel plating, cylinder grinding, overhauling magnetos, generators and starting motors, welding, etc., is sent outside to those who make a specialty of such work.

"The combined fleets of our Companies now number over 1400 vehicles comprising over 600 gasoline trucks, 350 electric trucks of various capacities, 15 emergency cars, and about 450 passenger vehicles.

"In addition to the automotive equipment mentioned there is also about 3,000 units of miscellaneous equipment such as pole dinkies, compressors, tool carts, derricks, etc., which are kept in repair at this station."

Bus and Trucking Executive Available

A PRACTICAL man, who has been in physical charge of Operation and Maintenance of large fleets, wishes to make connection with a growing concern.

Willing to locate anywhere. Past properties speak for themselves. References and interviews, at your convenience, can be arranged by corresponding with The Editor, FLEET OWNER, 90 West Street, New York City. Refer to Account No. 11.

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HERE'S a hand-picked assortment of literature that is offered to you entirely without obligation.

We've even made it easy for you to get it. Fill in the coupon below, mail to the Editor, and let us do the work. We'll ask them to send it at once and not to bother you with salesmen, either.

46. Free Slide Rule. You don't have to be a "slide rule artist" to use this celluloid slide rule that a leading truck manufacturer is distributing to interested fleet operators. This particular rule shows how to compute truck loads, taking into consideration such things as gear ratios, road grades, tire sizes and transmission gears. Somebody swiped ours, so it must be worth having. Number 46 brings one free for the asking.

47. Universal Joints for Fords. If you are having grief with Model AA trucks, particularly with the universal coupling located behind the transmission, one of our manufacturing friends has a descriptive folder that should be of interest. He makes a new universal joint and shaft assembly for replacement and will gladly send his booklet free. Ask for No. 47.

48. Bend Your Own. With a new duplex valve converting tool, any fleet owner can bend his own tire valve stems to fit any type of bus or truck rim or wheel. If you mention No. 48 we'll gladly see that you get the literature describing it, without obligation.

49. How to Fit Pistons. This is but one of the few things that you'll find in an interesting, new, piston and pin catalog recently announced. The manufacturer of this line caters especially to fleet owners and is prepared, we understand, to make pistons to special order, in any style and covering any models you may specify. We'll see that you get his proposition if you'll just say the word.

50. Replacement Cylinder Heads. For your Chevvies, Henrys, Ponties and light G. M. C.'s. Literature covering these cylinder heads is now available. Also a catalog of replacement flywheel starter gears for all types of motors. These will come to you free if you mention No. 50.

51. One Pint Free for the Asking! We wish it were something to drink, but it's not. It's just a free, full-pint sample of a new, quick-drying enamel that one of our friendly manufacturers is offering to fleet owners without obligation of any kind. Please state the color desired, and the number is 51. A purple stamp must be used on your envelope. After a couple of years a red one will do, but we hope you won't wait that long to send in the coupon below.

52. Not Woven, Stitched or Laminated. A new type of brake lining that is supplied in rolls, sets or units. As the maker would say, it's a "dense. non-metallic, homogeneous, solid brake material that contains no rubber." If the suspense is too great, just mark No. 52 on the coupon below and we'll see that you get the literature on this new braking material without obligation.

53. Eliminate Motor Overhauls. We'd gladly kiss anyone who could show us how to get rid of this periodical, necessary evil, but guess it'll be some time before we can really find him. However, one good brother claims to have a really efficient air cleaner that will *tend* to eliminate expensive motor overhauls and we imagine that things of this kind are at least worth investigating. Number 53 will bring the full details and you won't be obligated, either.

54. Check and Double Check! A famous slogan, but the double checking is not necessary if your tire valves are equipped with the new "Dublcheck" valve cap, which permits instant inflation and testing without removing anything. It provides a double-check on air leaks, too. Number 54 brings a free folder that should be of interest.

55. Mr. Vacuum's Not Unemployed. No unemployment problem as far as Mr. Intake Vacuum is concerned. One of his most important jobs is that of stopping vehicles, by means of the vacuum power brake. A newly designed power braking system that is said to be adaptable to even the largest and heaviest of trucks, buses and trailer trains has just been brought out by one of the pioneers in this field. Number 55 will bring you the dope, without strings attached.

56. No More Tug of War! Here's literature describing a new, inexpensive hand tool to do the work of high-priced tire spreading machines, unless we've missed our guess. This particular machine is claimed to spread heavy tires easily, for inspection and repair and they say that there's no danger of slipping or injury, either. We won't tell you the price so that you'll have to mention No. 56 if you want the full details. The coupon's below for your convenience.

57. Boil It—Soak It—Bury It. These are only a few of the things that you are invited to do to a free sample of "compound lumber" that is offered to operators. You are also asked to expose it to flame, subject it to sun and rain, hammer the edges and have a general good time with it. This new product called "Phemaloid" is a new plywood that comes in sheets as large as you want them and has a number of new features, the makers say. The sample's free for the asking if you mention No. 57.

58. How to Build Truck Bodies. At last we have run across a really worth-while book that gives some real "How-to-Do-It" information on truck body building. It tells you how to build sills, posts, roofs, top rails, floors, panels, doors and gates and how you can save weight and increase payloads by using aluminum. This is not an "excuse" for a book, but is a 90-page, thoroughly illustrated volume. No cost, but it's worth a lot. Number 58, please.

59. Facts About Air Brakes. It seems we've forgotten to include anything on air brakes in our previous announcements of literature, but "better late than never." A 28-page book is available that gives all the information necessary on the subject of Air Brakes. It tells what they are and how they work; also gives interesting cost figures on brake maintenance per mile. We should not want to be accused of partiality, so number 59 brings the air brake literature.

60. Shop Equipment Catalog. If you like to look at pictures you'll find plenty in this big, illustrated catalog on general garage equipment; also the prices, which we understand are in line with the times. What's in it? Air compressors, car washers, tire machinery, wheel aligning equipment, lifts, hoists, jacks, presses, brake machinery—in fact the line is most attractive and it's free. No. 60 brings it.

The Editor, ...1932
FLEET OWNER,
90 West St., New York, N. Y.

Kindly send me without obligation, the following free books mentioned in the.....issue. (Literature will not be sent unless firm name is given.) Order by number.

....

....

....

Firm Name .....

Address .....

City and State .....

Your Name .....Position .....

Servicing Bendix-Hydraulics

(*Continued from page 30*)

and insert .008-inch feeler gauge about 1½ inches from anchor pin end of secondary shoe lining. Through forward and backward movement of the pin, accompanied by the eccentric adjustment, desired clearances can be easily obtained.

Wheel cylinders (8 in Fig. 5) may be removed without disassembling brakes. For front cylinders, loosen hose one-quarter turn at each wheel cylinder fitting, remove two cap screws holding cylinder to backing plate, insert screw-driver between end of shoe (4) and anchor pin (5) and force shoe outward until piston pin (11) can be removed. Repeat operation on other shoe. Cylinder may then be partially withdrawn. Unscrew hose from cylinder to complete operation. For rear cylinders, first remove tubing from rear inlet connection and proceed as with front cylinders. Care must be taken in replacing cylinder so that hose will not be twisted.

Whenever any part of the system has been disconnected it is necessary to "bleed" the system to expel all air. Before beginning the bleeding operation the supply tank should be filled with genuine Lockheed brake fluid, through "N" in Fig. 1, and kept at least half full of fluid. Otherwise, air will enter the supply tank and rebleeding will be necessary.

A bleeder valve (L in Fig. 3) projects from each wheel cylinder. Remove this cap screw and screw in bleeder drain, which is a rubber tube with fitting attached. Allow tube to hang in clean container. Then unscrew bleeder valve three-quarters of a turn and depress foot brake pedal by hand, allowing spring (I in Fig. 1) to return pedal to "off" position. This gives a pumping action which forces fluid through the line and out at wheel cylinders, carrying with it any air that may be present. Approximately ten strokes of the pedal will be necessary to bleed each wheel cylinder.

Watch flow of fluid from hose, the end of which should be kept below surface of fluid, and when all air bubbles cease to appear or when stream is a solid mass, close the bleeder valve. Open valve again to allow a slight amount of fluid to drain, then tighten bleeder valve securely and replace cap screw. Repeat on each wheel. Fluid that has been drained through bleeder valve should never be used to refill the supply tank.

An explanation of the various illustrations that appear in connection with this article follows:

Fig. 1—Cutaway view showing master cylinder and supply tank for brake fluid.

Fig. 2—Method of operating adjusting screw.

Fig. 3—Back of left front brake showing: (L) bleeder valve; (5) anchor pin; (16) eccentric adjustment; (17) adjusting hole cover.

Fig. 4—Eccentric type anchor pin.

Fig. 5—Wheel side view of left rear brake with drum removed showing: (1) secondary shoe return spring; (2) adjusting screw; (3) secondary shoe; (4) primary shoe; (5) anchor pin; (6) primary and secondary shoe return spring; (7) cable return spring; (8) wheel cylinder; (9) adjusting screw locking spring; (10) secondary shoe spring anchor hole; (11) piston pin; (12) primary shoe return spring; (13) shoe hold-down spring; (14) pivot nut; (15) parking brake operating lever.

All-Wheel Drives

(*Continued from page 36*)

Heavy duty, six-cylinder engines are used with maximum brake horsepower ranging from 73 to 190. The engine of the smallest model has 190 foot-pounds torque and the engine in one of the largest models has 500 foot-pounds torque. Four-wheel hydraulic brakes are used on four of the smallest models, but the remainder have all-wheel actuating Westinghouse air brakes as standard equipment.

The new Marmon-Herrington line includes nine models of four-wheel drive trucks and three six-wheel drive models. The largest four-wheel drive truck has a capacity of seven and one-half tons, while the smallest six-wheel drive unit has a capacity of seven and one-half to ten tons. All models are equipped with dual tires on the rear wheels.

Other features of the Marmon-Herrington line which are common on all units are seven-bearing crankshafts, down-shaft carburetion, extra-large universals, constant velocity front axle joints, oversize rear axle shafts, optional rear axle ratios, positive hand brakes, frames of chrome manganese steel with alloy cast steel brackets, Ross cam-and-lever steering systems, and large-capacity gasoline tanks. Most of the models have two gasoline tanks, one mounted on each side of the frame, and most frames are equipped with heavy steel fishplates.

Outstanding in the construction of Marmon-Herrington trucks as a whole is the general use of the three-point method of suspension. Engines, standard transmissions, auxiliary transmission, bodies, and even the cabs and gasoline tanks are mounted at three points. Another important point is that the propeller shafts leading to the front and rear wheels have an unloaded angularity of only three degrees. The trucks are engineered, however, so that when loaded, there is no angularity whatever, the shafts being on a straight-line between front and rear axles.

New Reo Trucks

(*Continued from page 34*)

radius rods, to list at $3,645 f. o. b. factory. The Ability Rating on this truck will be 20,000-3¾-38. The standard 4-ton Tractor unit will be rated 32,000-1½-43, and the Special Tractor, with equipment listed above, at 32,000-2-36.

Despite its low price, the New Reo 2-Tonner contains many of the distinctive features of the 4-Ton Truck, and is comparable from the standpoint of appearance and general specifications. It is furnished in several wheelbases from 142 in. up. As in the case of the 4-Ton, dual rear tires are standard equipment.

The 6-cylinder Gold Crown Engine develops 75 horsepower at 2,800 R. P. M's. The chrome nickel block and Lo-ex aluminum pistons are also features of this truck engine. Other important features are: Reo-built 4-speed transmission; full-floating Reo-built rear axle with spiral bevel final drive; cam-and-lever steering gear; hydraulic internal expanding 4-wheel brakes; channel type frame; semi-eliptic helper springs over axle; same size tires front and rear.

A POSTER entitled "School's Out—Watch for the Children!" has been developed by General Baking Company of New York City, for the purpose of helping its employees remember the increased hazards that come with the closing of schools. The poster is done in two colors and has been distributed to all Company plants co-incident with the closing of schools early this summer.

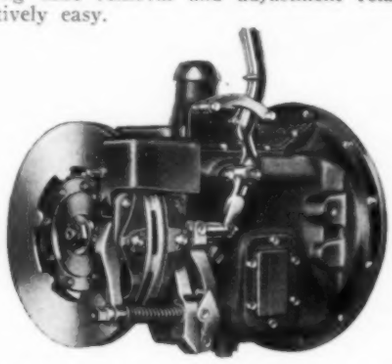
A NEW, high-priced motor oil known as "Syntholube" is announced by Standard Oil Company, Indiana). Initial sales plans call for its marketing in five-gallon sealed drums. The oil is made from paraffin wax. In the process, it is stated, the paraffin molecules are broken up and actually rebuilt, to make particular kinds of hydrocarbons having superlative lubricating properties.

for ROAD and SHOP

Tru-Stop Brake Redesigned

THE Automotive Division of the American Cable Company, Inc., Bridgeport, Conn., has redesigned its Tru-Stop Ventilated Disc Brake.

This emergency brake is for use on trucks and busses. It is of more compact design than the old style. Relining of shoes has been greatly simplified by making shoe removal and adjustment relatively easy.



The distinctive feature of the Tru-Stop Brake is the use of a ventilated disc mounted on the main transmission shaft directly behind the housing, this disc being gripped between two shoes, that are applied with uniform pressure by a simple mechanism connected directly to the operating lever. The brake shoes are supported on levers pivoted to a bracket which is secured to the transmission housing or the frame.

Literature describing this new brake will be sent without obligation if you mention FLEET OWNER and write to American Cable Company, Bridgeport, Conn.

Water Pump Parts by Toledo

THE Toledo Steel Products Company announces a new line of water pump parts. This line includes impellers, shafts, bushings, packing nuts and packing.

All parts are exact specification duplicates of original equipment and are made of high grade steel, special analysis bronze and best grade of iron, it is stated. These parts are of the same quality that characterizes Toledo valves and Toledo Blue-Print bolts and bushings.

Toledo jobbers throughout the country now carry complete stocks and are ready to make immediate delivery of Toledo water pump parts.

All details can be secured on application to The Toledo Steel Products Company, Toledo, Ohio. Please mention FLEET OWNER when writing.

New Book on 1932 Fords

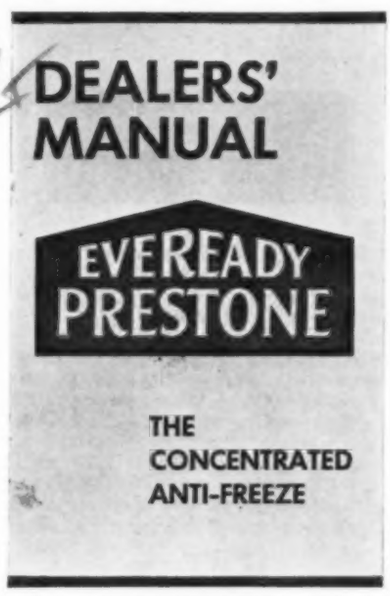
A NEW text-book entitled "The Ford V-Eight, B-Four and BB Truck" has just been published by Frederick J. Drake & Co., 179 N. Michigan Ave., Chicago, Ill.

It is written by G. B. Manly, a recognized authority on automotive service and should be of interest to every fleet owner using Ford equipment, inasmuch as it covers the construction, adjustment, upkeep, care and repair of the 1932 Ford cars and trucks.

This is a 308-page book, bound in flexible leatherette cover, and containing many interesting illustrations that have, for the most part, not been published in other books. There are eight chapters and a useful, trouble-finding index. The price of this book is $2.00.

New Cooling System Manual

THE annual edition of National Carbon Company's "Service Manual," giving complete instructions for servicing cooling systems, is now off the press and ready for distribution to fleet owners.

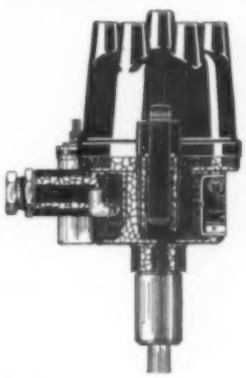


The new booklet contains the latest information obtainable in the automotive field for the care and general servicing of cooling systems, and is based on research work carried on for a number of years by the makers of Eveready Prestone, and other companies and organizations.

The annual editions of the manual have been distributed in the past to thousands of firms and with the increasing appreciation of the importance of the proper servicing of cooling systems, it is proving a valuable aid to all service men.

Copies of the booklet can be procured from National Carbon Company, 30 East Forty-Second Street, New York City. If a post-card request is addressed to the above address or to the editor of this publication, a free copy will be forwarded.

Vacuum-Controlled Distributor



A NEW ignition system, consisting of the Mallory distributor with vacuum-timed governor, for installation on all cars, trucks and buses, is announced by Mallory Electric Corp., Vancouver Ave. & P. M. R. R., Detroit, Mich.

The new Mallory ignition system is claimed to have many unusual and important advantages, the chief one being that it "times the ignition in accordance with the engine *load*, as well as the speed."

In this distributor there is a centrifugal governor, controlled by a governor-brake, operated by the vacuum in the intake manifold. The suction or vacuum does not advance the timing, but only releases the brake from the governor, permitting proper advance at higher speeds.

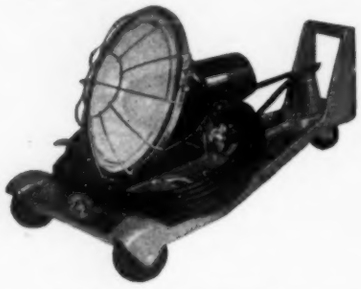
When the engine is running at top speed and the suction is low, the brake does not affect the governor, even though it is engaged, because the centrifugal force has sufficient power to overcome the friction imposed by the brake. When the engine is working under heavy loads, and at low speeds the high vacuum in the intake manifold applies the brake to the governor, preventing too far a spark advance and eliminating "spark knock" and other objectionable conditions.

An interesting bulletin gives complete details regarding this new ignition system and also explains how it can replace practically any existing distributor. When writing, ask for Bulletin 160. The Editor will secure a copy, if you prefer.

NEW STUFF *for* ROAD *and* SHOP (*Continued*)

Benjamin "Mobilite"

THIS is a porcelain-enameled steel floodlight of high efficiency, mounted on a broad, low-swung cast truck. The truck is equipped with quiet, easy-rolling fibre wheels, of three-wheel design, pivoted at the rear and is claimed to roll freely in any direction.



The handle is cast integral with the truck and also makes the truck convenient to carry about. Mobilite is built with minimum clearance so that it can roll under even the lowest of cars, trucks or busses.

The floodlight reflector of the Mobilite directs the maximum quantity of light on the work and in addition, shields the eyes from the glare of the lamp, according to the makers. It is used just like the mechanics' creeper and is equipped with wire guard, clear glass cover and rubber-covered service cord with soft rubber plug.

For full particulars and prices write to Benjamin Electric Company, Des Plaines, Ill., mentioning this publication, if you please.

New "Pot-O-Gold" Safe

FLEET owners whose drivers do a considerable amount of C. O. D. delivery work will find the Guncor "Pot-O-Gold" safe of interest. It is the latest product of Gunite Foundries Corp., Rockford, Ill., makers of brake drums.

This safe can be installed in a wall, floor, or a square of concrete built into the corner of a room or closet. It has 900 cu. in. of space for storage. It was designed to meet the needs of business houses for the protection of money and other valuables against burglary, hold-up or fire.

The material of which this safe is made is non-drillable, non-breakable and non-crushable, according to the makers. It is also available with a slot or money-slide for the purpose of making deposits without opening the safe. Write to Gunite Foundries Corporation, Rockford, Ill., for further details and prices.

Hoof Service Parts Catalog

ONE of the latest manufacturers' catalogs that has been brought to our attention is that issued by John C. Hoof Company, 162 N. Franklin St., Chicago, Ill.

This catalog lists the following products for all cars, trucks and busses: Textolite and metal timing gears; piston rings and brake drums for Ford and Chevrolet; valve guides; high compression cylinder heads for Fords; valve lifter parts; piston expanders; and clutch plates for all cars.

The catalog is quite complete with 1932 specifications and copies will be mailed to fleet operators without obligation. A request to the Hoof Company or to the Editor will bring a copy at once. Please mention this publication when writing.

Chevrolet Shop Kinks

A NEW illustrated book of "Shop Kinks" for 1930-31-32 models of Chevrolet cars and trucks is offered to our readers with the compliments of National Machine & Tool Company, Jackson, Mich.

Besides containing several pages of valuable short cuts in servicing the Chevrolet cars, it also devotes a section to illustrating and describing a complete line of special tools to make hard jobs on this car, easy ones.

Fleet owners can obtain copies of this book without cost or obligation by writing to the Company mentioned above. The Editor will gladly get a copy for you, if you prefer.

A Report on Prestone

NATIONAL Carbon Company, Inc. recently completed a series of experiments, the results of which showed that the new Eveready Prestone anti-freeze reduces the rusting effect of water on iron by ninety-five per cent, and the corrosion of radiator metals by seventy-five per cent.

The reduction of corrosion is effected by use of a "rust inhibitor" which protects all metals in contact with the solution.

Next to the danger from freeze-ups in winter, rust and corrosion present the greatest menace to efficient functioning of the cooling system. Automotive engineers state that fully seventy-five per cent of all over-heating is directly traceable to rust formation and subsequent clogging of radiators.

The experiments just completed indicate that the new Eveready Prestone installed in new cars or reasonably clean cooling systems eliminates rust clogging of radiators.

For Installing Chevrolet Drives

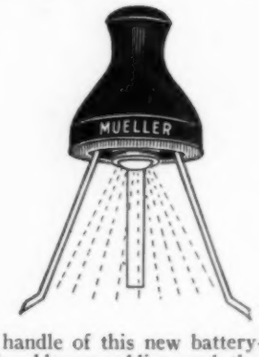
A NEW tool for installing the pinion bearing lock sleeve on all models of Chevrolets, is announced by National Machine & Tool Company, Jackson, Mich. It is called the "Chevrolet Pinion Bearing Lock Sleeve Tool."

This tool enables the mechanic to hold the lock sleeve against the front propeller shaft bearing when replacing the propeller shaft in its housing, regardless of whether the rear-end assembly is removed, or just the propeller shaft pulled, without removing the assembly.

The tool is made of two slim blades of Swedish spring steel, thin enough to slip through the pinion shaft rear bearing; it holds the lock sleeve in place so that the three lock screws can be inserted. The end of the handle is open, enabling the mechanic to drive the shaft into the housing. Write for further details, mentioning FLEET OWNER, if you please.

Mueller Battery-Light

THIS new flash-lamp uses the storage battery itself as the source of power for giving light when servicing a battery. Current for the 2-volt bulb is obtained by placing the pointed prongs across an individual cell.



The handle of this new battery-light is a solid rubber moulding and the prongs are of cadmium-plated steel. The bulb is completely housed and protected by a reflector. For details address Mueller Electric Co., 1583 E. 31st St., Cleveland, Ohio, mentioning this publication, please.

NEW STUFF *for* ROAD *and* SHOP (*Continued*)

New Electric Fuel Pump

STEWART-WARNER announces a new electric fuel pump for which the maker claims many outstanding advantages.

This new pump is a big departure from conventional electric fuel pumps, in that it has no contact points, diaphragm or bellows. This, according to the engineering department, eliminates the principal causes of failure in electric pumps. The pump, which is of the double-acting, piston type, has double the capacity of any pump of its size. It pumps more fuel on less current than any electric pump built; about .2 amperes when idling; .35 for normal operation, and .8 amperes when operating at maximum capacity of 25 gallons per hour, the makers claim. The pump is designed for single or gang assembly to replace or serve as alternate for other fuel systems.

A special tank model is designed for mounting on the fuel supply tank, the pumping unit being submerged in the fuel. This installation eliminates all vapor lock troubles; there being no suction lift, the pump is constrained to pump liquid fuel to the carburetor at all times.

New Tube Repair Mandrel

IN the new Dill Tube Repair Mandrel, the Dill Manufacturing Company of Cleveland has made a contribution to tire handling equipment. This all-metal mandrel is made with an ingenious folding arm construction. A shove of the hand pushes it down and out of the way. And it is just as easily pulled up, locking automatically into the correct working position.

This collapsible feature is an important advantage, especially for small shops or fleet tire repair departments where working space is at a premium. It can be mounted against the wall or work bench and when it is not in use, it is folded down flat so that it does not interfere with any of the other shop operations.

The mandrel itself has a smooth, rounded surface with just the right contour for tube work. It is large enough to handle all sizes of tubes, including the largest truck tubes, yet it works equally well on the smallest tire sizes.

Every tire repair man knows how exasperating it is to find just the right bearing surface to hold a tire tube so that it can be handled quickly and easily. The new Dill Tube Repair Mandrel is said to solve this problem. When writing for details, please mention FLEET OWNER.

Catalog Lists Small Tools

A HANDSOME new Small Tool Catalog, No. 32, is just being distributed by the Greenfield Tap and Die Corporation. The entire line of Taps, Dies, Screw Plates, Twist Drills, Reamers, Gages, Pipe Tools, and miscellaneous items of this company are completely listed and described.

Of particular interest is the new easy reference index, which makes the location of any tool in the 384 pages a simple and instant matter. The attractiveness of the catalog is greatly enhanced by its being printed throughout in color. Those who have not already received this catalog can obtain copies from the manufacturer or their distributors, free of charge.

There are also a number of valuable tables and considerable new data on the uses and application of small tools. For your free copy address Greenfield Tap & Die Corporation, Greenfield, Mass., mentioning this publication, please.

New Duco Polishing Wax

A NEW polishing wax, completely transparent, and proved to be proof against ultra violet ray, the destructive element in sunlight, has been developed by the Automotive Finishes Division of the du Pont Company.

More than one hundred formulae were tried out in arriving at the new product. It was tested by garage men and automobile owners in practically every part of the country and under as many different conditions as could be found. It was also tested on new cars by some of the large automobile car manufacturers.

Work on the new wax, it was stated by G. W. Sherin, Manager of the Chemical Specialties Division of the du Pont Company at Detroit, has been going on since July, 1930, the purpose being to find a protective covering that would be hard, lustrous and easy to put on, while at the same time it would be extremely durable.

Guncor Drums for Fords

A LINE of replacement brake drums for Ford cars and trucks has recently been developed by Gunite Foundries Corporation, Rockford, Ill. The maker points out that these will be marketed "at competitive prices."

The graphitic content of these brake drums, it is claimed, maintains satin smooth braking surface, with no reduction in braking power; also overcomes "stickiness" and prevents scoring, grabbing or tearing of brake linings.

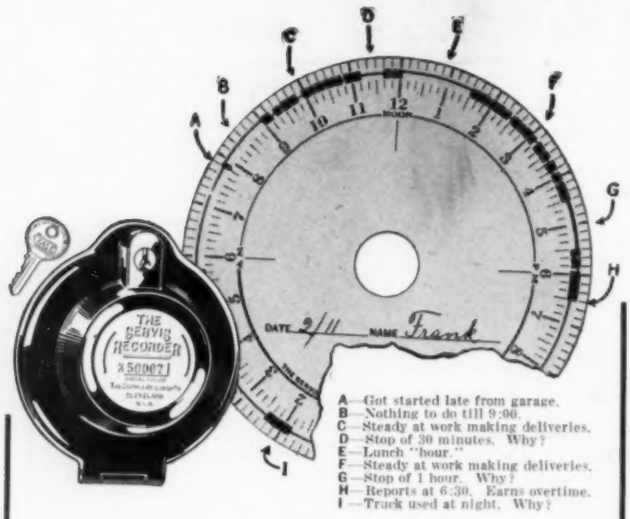
For further details and prices, write the Corporation above. You'll mention FLEET OWNER when writing, won't you?

Valve Rack for All Motors

THIS useful device to save time in valve grinding jobs is made by K-D Manufacturing Co., Lancaster, Pa.

It is known as No. 735 valve service rack, for all motors, and will hold 16 valves in the same order as removed from the motor, each position being numbered, as shown in the illustration.

The metal base of the rack is drilled so that it may be placed within easy reach on one of the motor studs if desired. The rack may also be removed to the work-bench for refacing the valves. The top surface is dished, making a convenient receptacle for valve keepers, etc. A special service rack for Ford motors is also made by this Company, who will be glad to send details and prices on request.


THE SERVIS RECORDER
DATE 2/11
NAME Frank
A—Got started late from garage.
B—Nothing to do till 9:00.
C—Steady at work making deliveries.
D—Stop of 30 minutes. Why?
E—Lunch "hour."
F—Steady at work making deliveries.
G—Stop of 1 hour. Why?
H—Reports at 6:30. Earns overtime.
I—Truck used at night. Why?

What's Your Truck Doing All Day?

This Little Device Tells Every Move the Truck Makes

SEE THAT CHART. Those wide heavy marks show just when your motor truck was working, and how long. In between are blank spaces that show idle time. The result is a complete record, in fact, a picture of just what your truck did all day and all night. The truck "writes" its own story. Simple, isn't it?

Save $500 Per Truck Per Year

Motor trucks are expensive to operate. The running time of a truck costs from $3.00 to $5.00 an hour! That's why delays, *avoidable* delays, are so costly. Half an hour per day *avoidable* idle time easily costs you $500 per year. It's a big loss. That's why over 70,000 trucks are already *Servis Recorder* equipped.

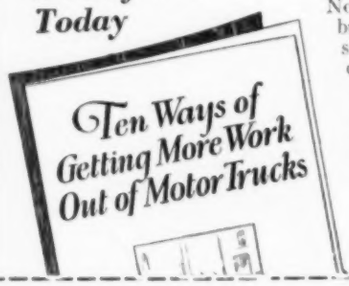
All You Need Is a Screw Driver

The little *Servis Recorder* that produces this "Busy-Idle" chart is attached to the truck merely by a couple of screws—why, you could even *nail* this *Servis Recorder* on your truck.

New 7-DAY Model Now Ready

Now you can get a 7 days' busy-idle record on a single chart without changing. When you lock the new 7-Day Recorder, you don't have to touch it again for a week! The coupon brings the the whole story.

Write for it Today



THE SERVICE RECORDER CO., F.O.1
Hanna Bldg., Cleveland, Ohio
Please send us, without obligation, "10 Ways of Getting More Work Out of Motor Trucks." Also information on the new 7-Day Model.

Company .....
Attention of .....
Street .....
City and State .....

The Service Recorder Company
Cleveland, Ohio

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"Keeps Trucks Busy"

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